GREE
Change for Life

Service Manual

Model: GVH48AH-M3DNA5A
(Refrigerant R410A)

GREE ELECTRIC APPLIANCES,INC.OF ZHUHAI

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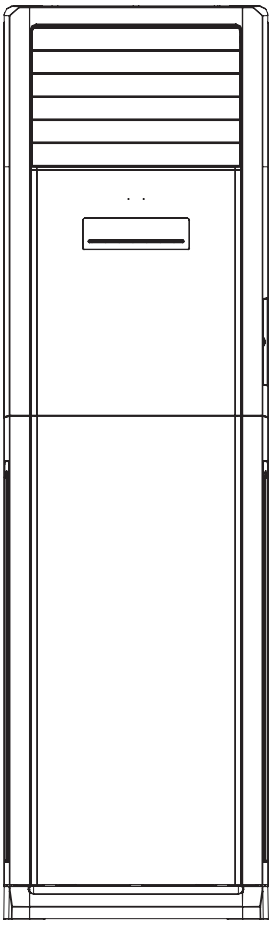
Part Ⅰ: Technical Information

1. Summary

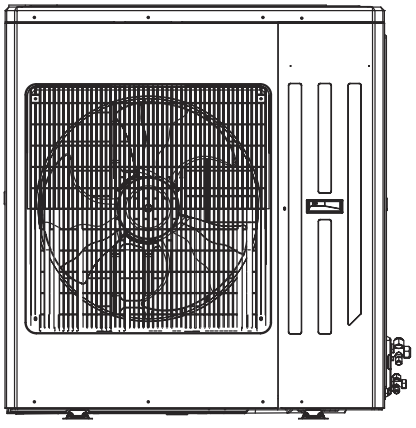
Indoor Unit:

GVH48AH-M3DNA5A/I



Outdoor Unit:

GVH48AH-M3DNA5A/O



Remote Controller:

YB1F2(XFAN)

2. Specifications

2.1 Specification Sheet

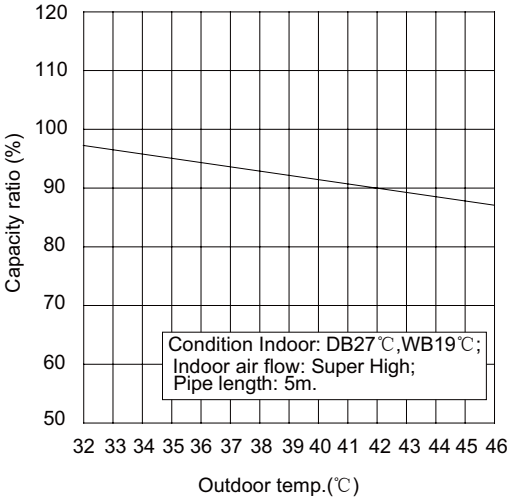
Parameter		Unit	Value
Model			GVH48AH-M3DNA5A
Product Code			CH090000500
Power Supply	Rated Voltage	V ～	380-415
	Rated Frequency	Hz	50/60
	Phases		3
Power Supply Mode			Outdoor
Cooling Capacity		W	12000
Heating Capacity		W	13600
Cooling Power Input		W	4000
Heating Power Input		W	4200
Cooling Power Current		A	6
Heating Power Current		A	6.5
Rated Input		W	5400
Rated Current		A	9.5
Air Flow Volume(SH/H/M/L/SL)		m^3/h	1850/1800/1700/1530/-
Dehumidifying Volume		L/h	5
EER		W/W	3
COP		W/W	3.24
SEER		W/W	5.1
SCOP		W/W	3.8
Application Area		m^2	55-85
Indoor Unit	Model of indoor unit		GVH48AH-M3DNA5A/I
	Indoor Unit Product Code		CH090N00500
	Fan Type		Centrifugal
	Diameter Length(DXL)	mm	Φ369X180.5
	Fan Motor Cooling Speed(SH/H/M/L/SL)	r/min	585/540/500/460/-
	Fan Motor Heating Speed(SH/H/M/L/SL)	r/min	585/540/500/460/-
	Output of Fan Motor	W	180
	Fan Motor RLA	A	/
	Fan Motor Capacitor	μF	/
	Input of Heater	W	/
	Evaporator Form		Aluminum Fin-copper Tube
	Pipe Diameter	mm	Φ7.94
	Row-fin Gap	mm	3-1.5
	Coil Length (LXDXW)	mm	472X62X836
	Swing Motor Model		MP35AK/MP35AB
	Output of Swing Motor	W	2
	Fuse	A	5
	Sound Pressure Level (SH/H/M/L/SL)	dB (A)	52/50/48/45/-
	Sound Power Level (SH/H/M/L/SL)	dB (A)	63/61/58/56/-
	Dimension (WXHXD)	mm	1870X580X400
	Dimension of Carton Box (LXWXH)	mm	2080X735X530
	Dimension of Package(LXWXH)	mm	2083X738X545
	Net Weight	kg	58
	Gross Weight	kg	84

Outdoor Unit	Model of Outdoor Unit		GVH48AH-M3DNA5A/O
	Outdoor Unit Product Code		CH090W00500
	Compressor Manufacturer/Trademark		MITSUBISHI ELECTRIC (GUANGZHOU COMPRESSOR CO.,LTD)
	Compressor Model		TNB306FPNMC
	Compressor Oil		FV50S
	Compressor Type		Rotary
	L.R.A.	A	/
	Compressor RLA	A	9.3
	Compressor Power Input	W	3010
	Overload Protector		CS-7C-1595
	Throttling Method		Electron expansion valve
	Operation Temp	ºC	16~30
	Ambient Temp (Cooling)	ºC	18~43
	Ambient Temp (Heating)	ºC	-15~24
	Condenser Form		Aluminum Fin-copper Tube
	Pipe Diameter	mm	Φ9.52
	Rows-fin Gap	mm	2-1.4
	Coil Length (LXDXW)	mm	1047X44X1067
	Fan Motor Speed	rpm	800/640
	Output of Fan Motor	W	170
	Fan Motor RLA	A	/
	Fan Motor Capacitor	μF	/
	Air Flow Volume of Outdoor Unit	m^3/h	2000
	Fan Type		Axial-flow
	Fan Diameter	mm	Φ570
	Defrosting Method		Automatic Defrosting
	Climate Type		T1
	Isolation		I
	Moisture Protection		IP24
	Permissible Excessive Operating Pressure for the Discharge Side	MPa	4.3
	Permissible Excessive Operating Pressure for the Suction Side	MPa	2.5
	Sound Pressure Level (H/M/L)	dB (A)	63-/-
	Sound Power Level (H/M/L)	dB (A)	70/-/-
	Dimension (WXHXD)	mm	1018X1107X440
	Dimension of Carton Box (LXWXH)	mm	1155X480X1115
	Dimension of Package(LXWXH)	mm	1158X483X1130
	Net Weight	kg	94
	Gross Weight	kg	105
	Refrigerant		R410A
	Refrigerant Charge	kg	3.5
Connection Pipe	Length	m	5
	Gas Additional Charge	g/m	50
	Outer Diameter Liquid Pipe	mm	Φ9.52
	Outer Diameter Gas Pipe	mm	Φ16
	Max Distance Height	m	10
	Max Distance Length	m	25
	Note: The connection pipe applies metric diameter.		

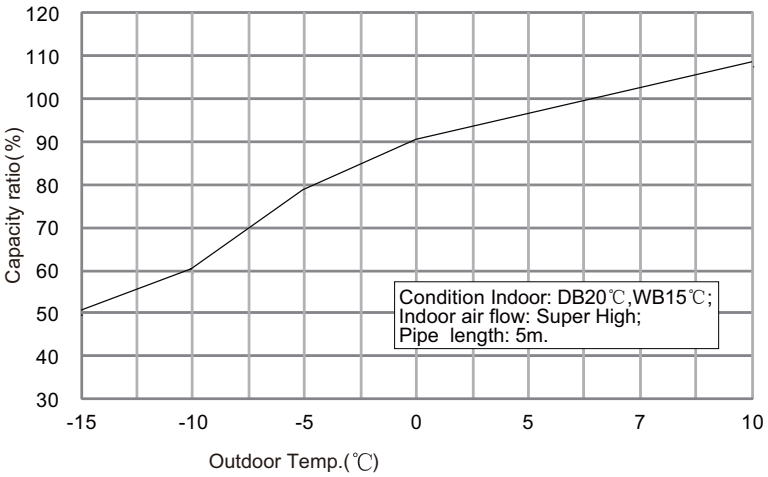
The above data is subject to change without notice; please refer to the nameplate of the unit.

2.2 Capacity Curve in Different Outdoor Temperature

Cooling:



Heating:



2.3 Cooling and Heating Data Sheet in Rated Frequency

Cooling:

Rated cooling condition(°C) (DB/WB)		Model	Pressure of gas pipe connecting indoor and outdoor unit	Inlet and outlet pipe temperature of heat exchanger		Fan speed of indoor unit	Fan speed of outdoor unit
Indoor	Outdoor		P (MPa)	T1 (°C)	T2 (°C)		
27/19	35/24	48K	0.8~1.0	8.0~12	43~39	Super High	High

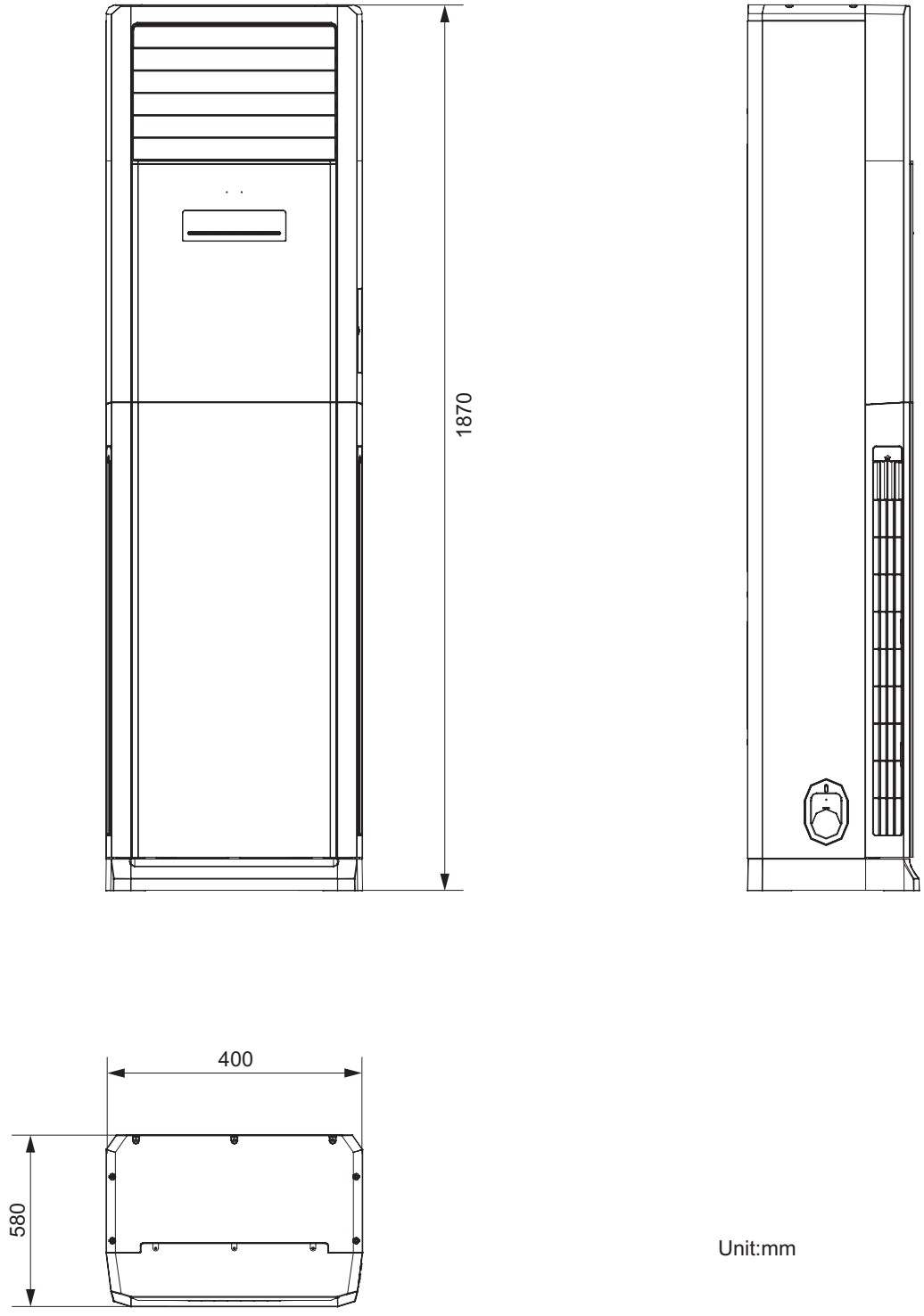
Heating:

Rated heating condition(°C) (DB/WB)		Model	Pressure of gas pipe connecting indoor and outdoor unit	Inlet and outlet pipe temperature of heat exchanger		Fan speed of indoor unit	Fan speed of outdoor unit
Indoor	Outdoor		P (MPa)	T1 (°C)	T2 (°C)		
20/-	7/6	48K	3.6~3.8	74~42	-3~3	Super High	High

Instruction:
T1: Inlet and outlet pipe temperature of evaporator
T2: Inlet and outlet pipe temperature of condenser
P: Pressure at the side of big valve
Connection pipe length:5m.

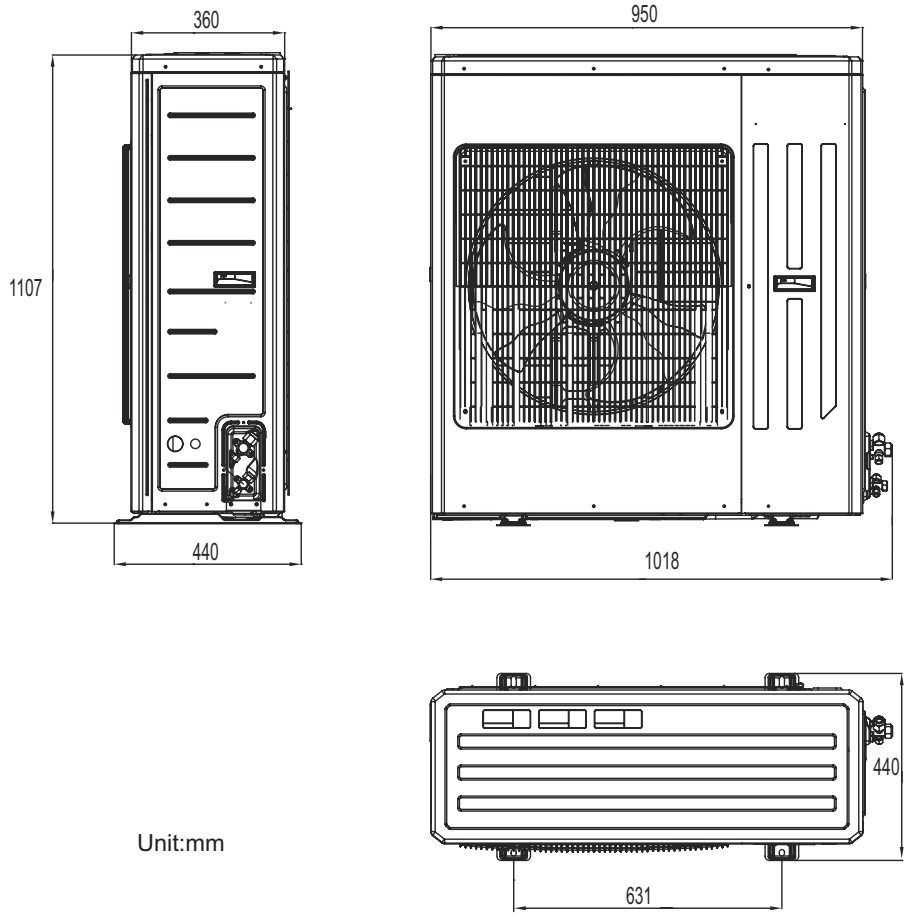
3. Outline Dimension Diagram

3.1 Indoor Unit



Unit:mm

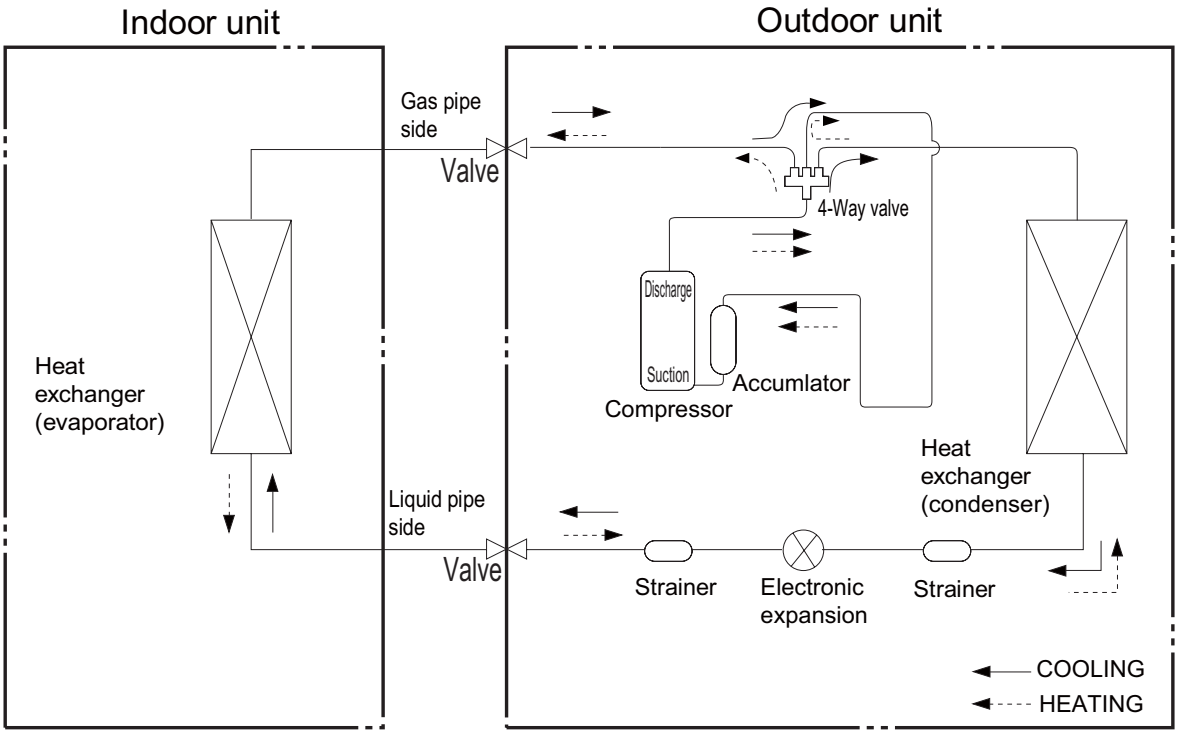
3.2 Outdoor Unit



Unit:mm

4. Refrigerant System Diagram

Cooling & Heating model



Connection pipe specification:
Liquid pipe:3/8" (9.52mm)
Gas pipe:5/8" (16mm)

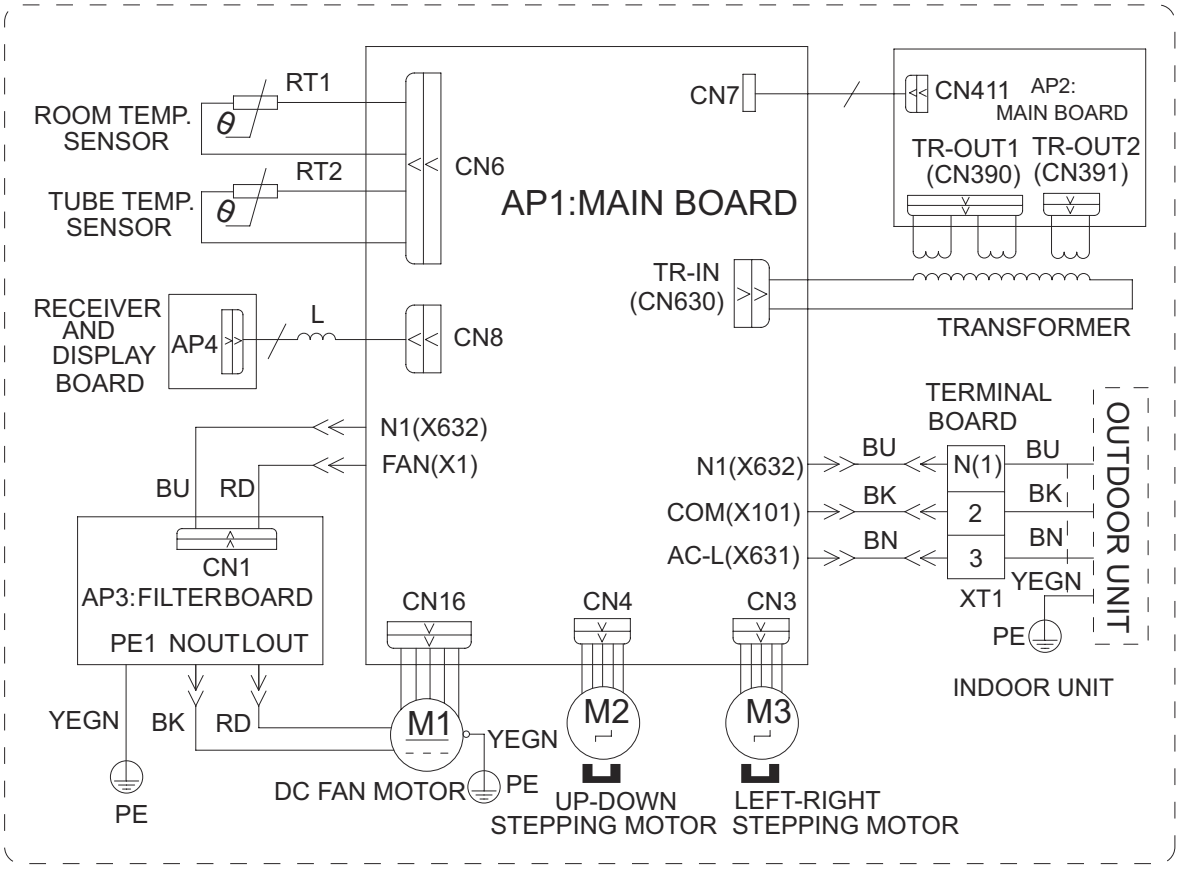
5. Electrical Part

5.1 Wiring Diagram

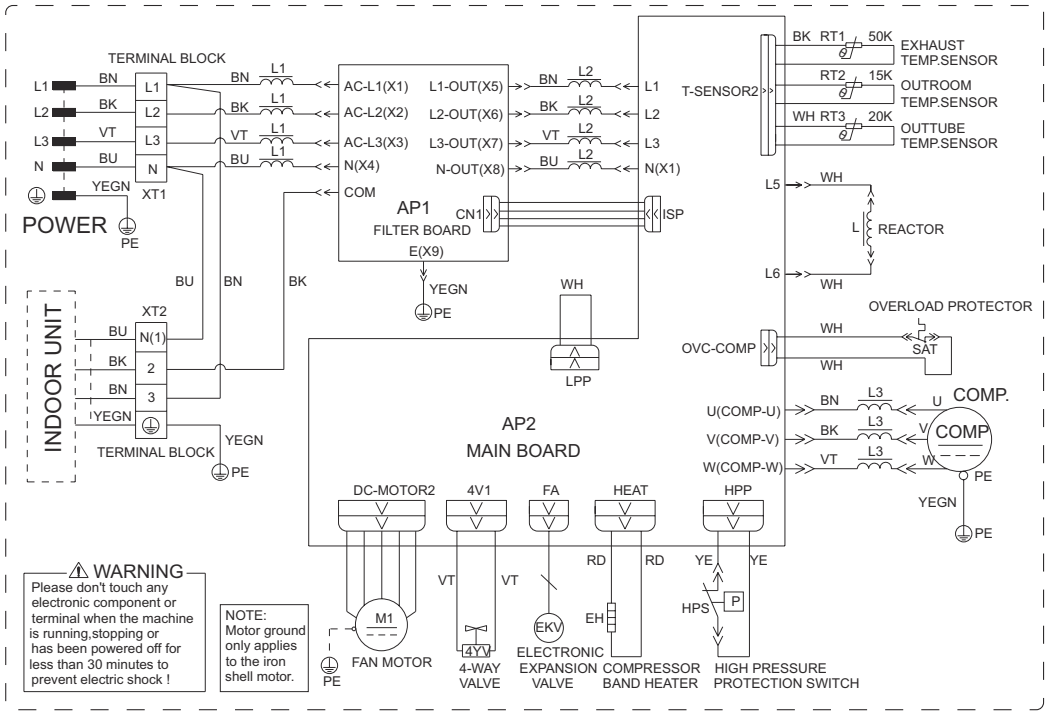
• Instruction

Symbol	Symbol Color	Symbol	Symbol Color	Symbol	Name
WH	White	GN	Green	SAT	OVERLOAD
YE	Yellow	BN	Brown	COMP	Compressor
RD	Red	BU	Blue	⏚	Grounding wire
YEGN	Yellow/Green	BK	Black	C1	CBB65
VT	Violet	OG	Orange	C2	CBB61

• Indoor Unit



● Outdoor Unit

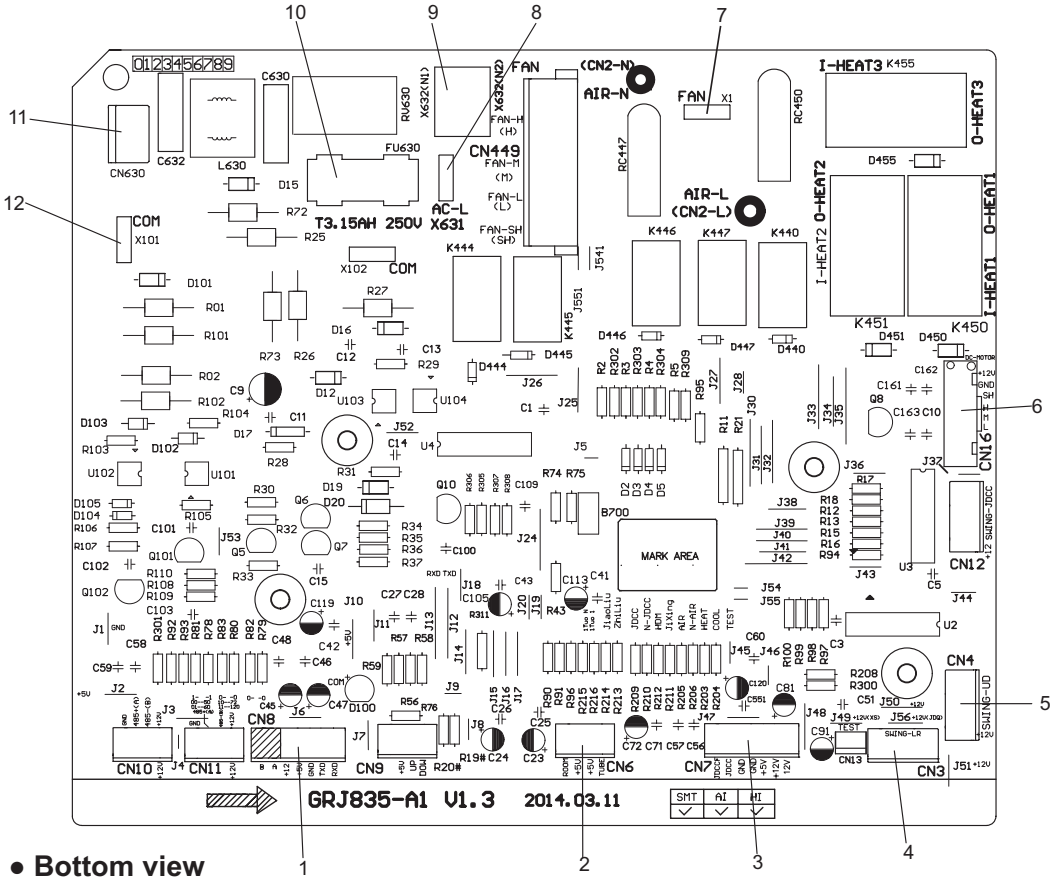


These wiring diagrams are subject to change without notice; please refer to the one supplied with the unit.

5.2 PCB Printed Diagram

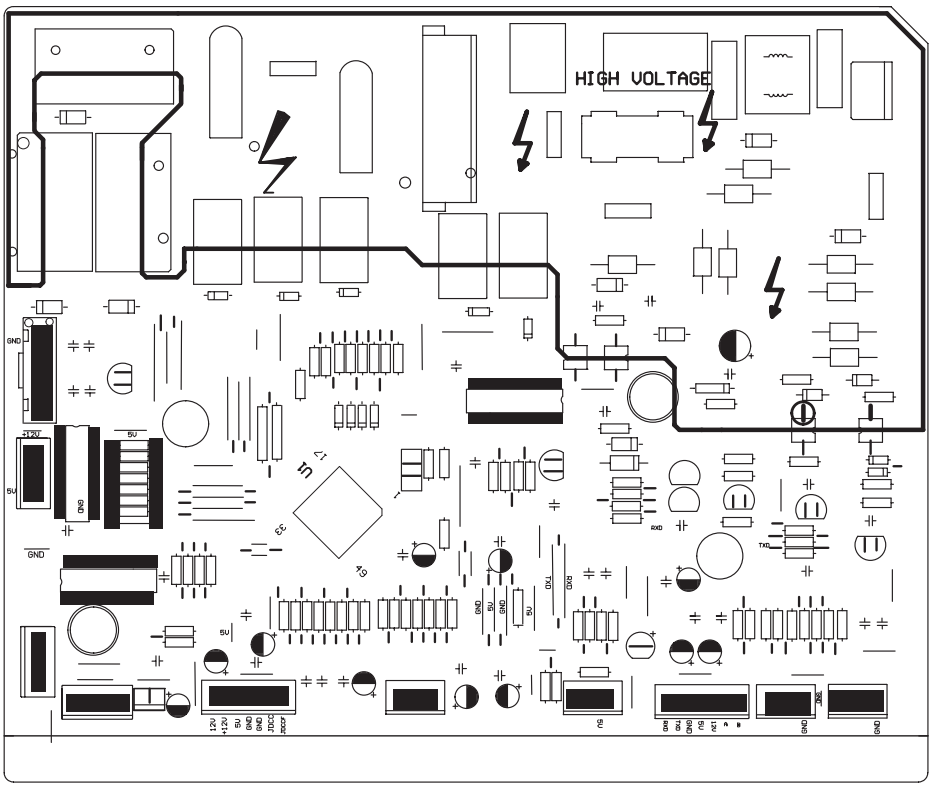
● Indoor Unit

● Top view



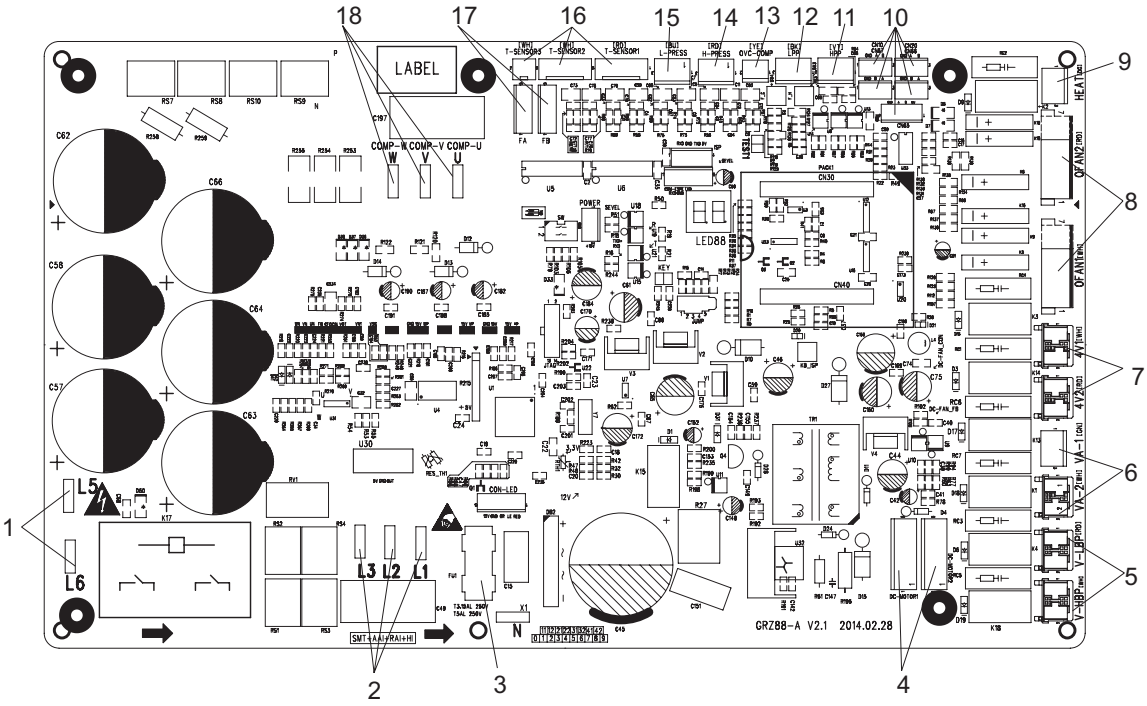
No.	Name
1	Wiring terminal of display board
2	Needle stand of temperature sensor
3	Connect to GRJ306-2A2CN411 on PCB board
4	Needle stand of left&right swing
5	Needle stand of up&down swing
6	Fan speed control terminal of drive board of DC fan
7	Terminal of live wire for drive board of DC fan
8	Terminal of live wire
9	Terminal of neutral wire
10	Fuse
11	Input terminal of transformer
12	Communication terminal

● Bottom view



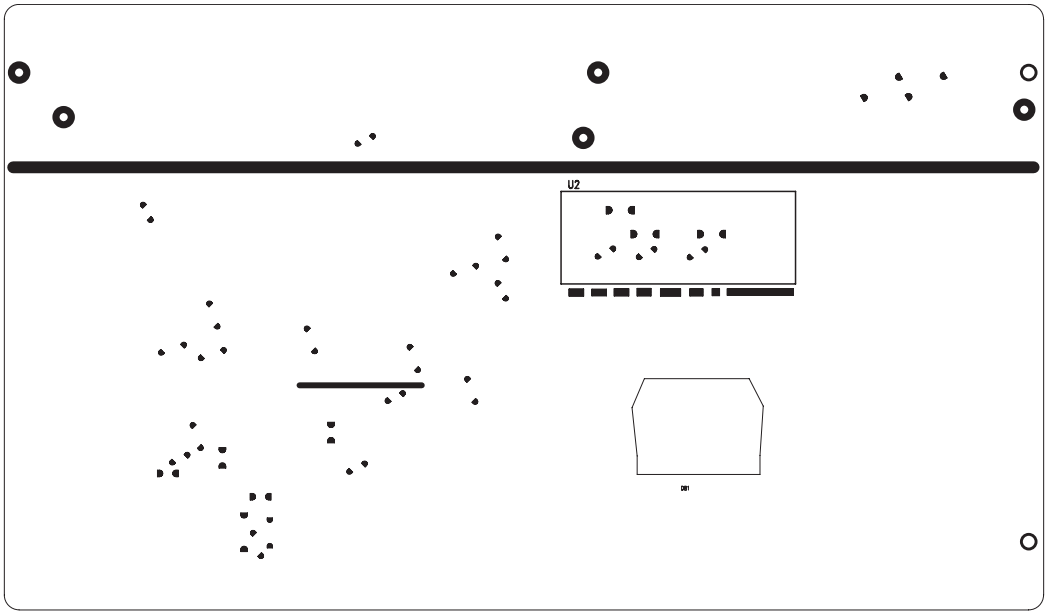
● Outdoor Unit

● Top view



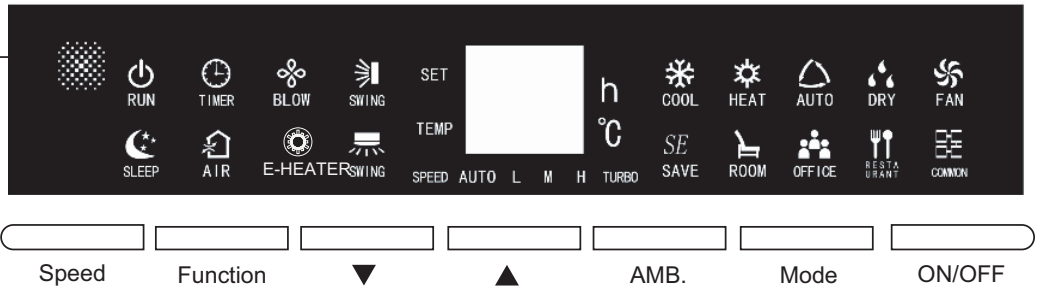
No.	Name
1	Wiring terminal of display board
2	Interface of power cord
3	Fuse
4	DC fan
5	By-pass valve
6	Electric heating of chassis
7	4-way valve
8	AC fan
9	Electric heating belt
10	Communication terminal
11	High-pressure valve
12	Low-pressure valve
13	Overload protection terminal of compressor
14	High-pressure sensor
15	Low-pressure sensor
16	Temperature sensor
17	Electronic expansion valve
18	Terminal of compressor

● Bottom view



6. Function and Control

6.1 Function Buttons of Air Conditioner



Buttons function and displayer

ON/OFF

ON/OFF Button

- Press this button, to turn on the unit. When unit is turned on, the original setting like Timer, Sleep function will be canceled.Note: When the unit is running in Dry mode, press ON/OFF button that can turn on the unit directly.
- When the unit start up running, the status light will display in red indicated as power turn-on and free-duty.

Mode

Mode Button

- Press the button, the circulating changes of mode are shown as below:

Auto → Cooling → Dehumidification → Heating ← Air Supply ←

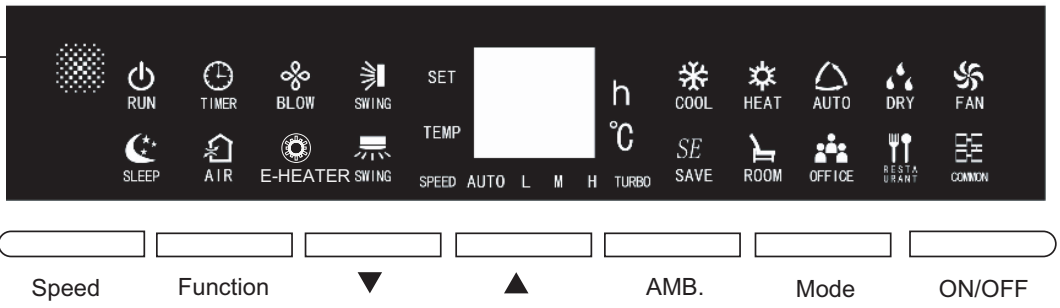
Auto: the controller will determine its operation mode according to changes of room temperatures under this mode.
Cooling: display cooling state.
Dehumidification: reduce temperature and keep the setting room temperature without any change.
Air supply: The compressor doesn't on work and only the indoor blower is on running under this mode.
Heating: Display the state of heating. (Note: Single-cooling machine is not equipped with heating mode)

▲and▼

▲and▼ Button

- Under the situation without setting the function, press ▲and ▼buttons, the setting temperature goes up and down 1℃, the regulating range is from 16℃ to 30℃.
- Under the conditions of setting the functions, can proceed with the round-trip option of this function (set ▲and ▼ opposite direction of circulation).
- Keep pressing ▲and▼ buttons for 3 seconds continuously, functions of all buttons on the display panel will be conductively-closed, and then press any button, the buzzer will ring once while "LC" is flashing for three times on the location of double 8 and resume to normal display so as to prompt users that the buttons have been locked up.When keep pressing again the two buttons for another 3 seconds continuously, the function of lockup will be removed and resume to display in normal state.

Buttons function and displayer



▲and▼

▲ and ▼ Buttons (Continued)

- After switch-on at first time, if without any button input:1. consecutively press twice of ▲ buttons in 20 seconds and soon access to the running of forced heating.After the blades of blowing up and down opens to the minimum position, start up running of all loads, indoor and outdoor high-speed blowers. All characters will be displayed when the non-inductive thermometer bulb is broken down. The fault codes of breakdown will be displayed when the inductive thermometer bulb is broken down and then the buzzer rings. After shutdown for five minutes or receiving shutdown signal within 5 minutes, it enter the status of normal standby. 2. consecutively press twice of ▼ buttons in 20 seconds and soon access to the running of forced cooling. After the blades of blowing up and down opens to the minimum position,start up running of all loads, indoor and outdoor high-speed blowers besides the four-way valve and then the buzzer rings. After shutdown for five minutes or receiving shutdown signal within 5 minutes,it enter the status of normal standby.

  The 1 and 2 Functions are for trial use only.

Speed

Speed Button

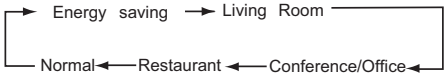
- Press this button, the speed can shift in the circulation among of " Auto⟶Low⟶Medium⟶High ⟶Super⟶Auto"

  Note: the function of forced low speed under operation of dehumi-dification is not available.

AMB.

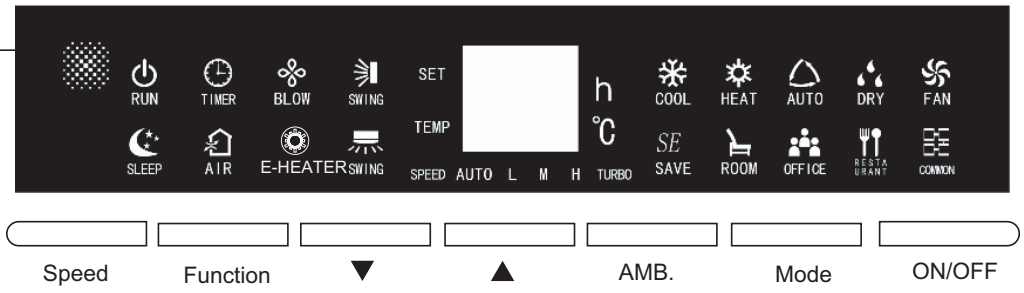
AMB. Button

- Press this button, AMB. circulating changes set forth below:



- Adjustable method of AMB. Button: The switch-on of AMB. mode at first time is the default of normal mode,when shutting down and starting up again,the AMB. mod will keep the setting status before last shutting down. Under the modes of energy-saving, conference/office and restaurant,the sleep function will be automatically cancelled. And the sleep function is not adjustable: sleep function is only available on service for cooling, dehumidification and heating under normal mode.

Buttons function and displayer



AMB.

AMB. Buttons (Continued)

- Under the modes of living room, restaurant, conference/office,The setting temperature, speed, blowing up and down as well as left and right can be adjustable. If users change the setting temperature, speed, blowing up and down as well as left and right, the operation will run in accordance with the status of setting adjustment. The services setting of blowing up and down as well as left and right of next time start-up will be remained before last shutdown while the setting temperature and speed will run with the default.
- Under the energy-saving mode, while the heating service is on running, the setting temperature, speed, blowing up and down as well as left and right can be adjustable. If users change the setting speed, blowing up and down as well as left and right,
- it will run according the status of users' setting adjustment. But the setting temperature under the energy-saving cooling function can not be adjusted.

AMB.

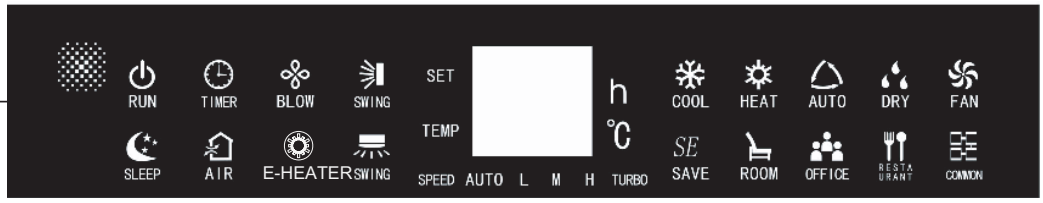
AMB.Buttons (Continued)

- The modes of living room, restaurant, conference/office can only be called out by pressing buttons of air conditioner panel. If receiving the signal from remote control when the air conditioner is running the modes of living room, restaurant, conference/office, it will exit from the abovementioned modes and run according to the modes of remote control.

Function

Function Button

- Under the status of switch-on, Every time press the function button, the settings of up and down, left and right, drying, concurrent heating, timing, air renewal, setting and room temperature can be shifted in sequence. When a certain character is flashing, it indicates can proceed its setting and go on setting by press buttons. The action will be confirmed if without receiving other operating order in 5 seconds. Or press the function button to leave for the confirm.
- Press the function button under the status of running drying service can directly proceed shutdown. Press the function button under the status of shutdown and non-drying can proceed timing setting.



Buttons function and displayer

Setting

- Display setting temperature.

Room temperature

- Indicate temperature of indoor circumstances.

Supper strong

- When the typeface light is on, it indicates setting the super strong function.

SE
SAVE

Mode of save

- Indicate mode of save.

ROOM

Mode of room

- Indicate mode of room.

OFFICE

Office mode

- Indicate mode of office.

RESTAURANT

Mode of restaurant

- Indicate mode of restaurant.

COMMON

Common mode

- Indicate common mode.

Swing

Status of swing

- Display status of swing.

Swing

Status of swing

- Display status of swing.

BLOW

BLOW Function

- When the typeface light is on, it indicates setting the BLOW function.

E-HEATER

E-HEATER Function

- This icon on the displayer turns on,indicates that the E-HEATER function turned on,the electrical heating, according to a certain condition, it can put into use.

TIMER

TIMER Function

- When the typeface light is on, it indicates setting the timer function.

SLEEP

SLEEP Function

- When the typeface light is on, it indicates setting the sleep function.

6.2 Description of Each Control Operation

1.Basic Functions

1.1 Cooling Mode

When Tamb.≥Tpreset+1℃, the unit will run in cooling mode. Meanwhile, compressor and outdoor fan will run. Indoor fan will run at setting fan speed;

When Tamb.≤Tpreset-1℃, the unit will stop running in cooling mode. Compressor and outdoor fan will stop running, while indoor fan is still running at setting fan speed;

When Tpreset-1℃<Tamb.<Tpreset+1℃, the unit will keep previous running status;

1.2 Dry Mode

When Tamb>Tpreset+2℃， the unit will run at cooling mode. Meanwhile, compressor and outdoor fan will run. Indoor fan will run at low fan speed.

When Tpreset-2℃≤Tamb. ≤Tpreset+2℃, compressor and outdoor fan will run for 6mins and then stop running for 4mins and they will run like that circularly. Indoor fan will run at low fan speed;

When Tamb.<Tpreset-2℃, compressor and outdoor fan will stop running. Indoor fan will run at low fan speed.

1.3 Heating Mode

When Tamb≤Tpreset-1℃, the unit will run in heating mode and the corresponding load will start running. Indoor fan will run at the condition of anti cold wind.

When Tamb.≥Tpreset+1℃, the corresponding load will be stopped. Indoor fan will run at setting fan speed and the condition of blowing residual heat.

When Tpreset<Tamb<Tpreset+1℃, the unit will keep previous running status.

1.4 Fan Mode

Indoor fan will run at setting fan speed. Compressor, outdoor fan and reversing valve will stop running.

1.5 Auto Mode

In this mode, the unit will decide its running mode according to the ambient temperature.

When Tamb>26℃, the unit will run in cooling mode. Internal setting temperature is 26℃;

When 20℃≤Tamb. ≤26℃, the unit will run in dry mode. Internal setting temperature is 24℃;

When Tamb.<20℃, the unit will run in heating mode. Internal setting temperature is 20℃. When Tamb.≥24℃, the unit will quit from the heating mode. As for the cooling only unit, when Tamb.<20℃, the unit will run at fan mode and the internal setting temperature is 20℃. When Tamb≥24℃, the unit will quit from the fan mode.

2. Protection Function

2.1 Indoor Antifreezing Protection

When antifreezing protection is detected, the corresponding load will be stopped. After the antifreezing protection is released, controller will run at setting mode. Buttons won't be shielded during the antifreezing protection.

2.2 High Pressure Protection of System

When high pressure protection is detected, the corresponding load will be stopped. All button and remote control signal will be shielded and E1 will be displayed; after high pressure protection of compressor is released, all buttons and remote control signal will become normal.

2.3 Low Pressure Protection of System

When low pressure protection is detected for the first time, the corresponding load will be stopped and the indicator will blink. If the low pressure protection is detected for twice successively, the corresponding load will be stopped and E3 will be displayed. They can't resume automatically.

2.4 High Temperature Protectionfor Discharge Pipe

When high temperature protection for discharge pipe is detected, the corresponding load will be stopped. E4 will be displayed.

2.5 Indoor High Temperature Resistant Protection

When high temperature resistant protection is detected, the corresponding load will be stopped.

2.6 Overcurrent Protection

When overcurrent protection is detected, the corresponding load will be stopped and E5 will be displayed.

3. Other Function

3.1 Defrosting

The unit will judge according to the tube temperature and ambient temperature, when it's detected that the outdoor condenser is frosting, the unit will start defrosting. Indoor fan and four-way valve will stop running. After defrosting is finished, the unit will start heating normally. During the time of defrosting, dual 8 will display H1.

3.2 Swing Function

Users can start up or stop the function of up&down swing, right&left swing.

3.3 Sleep

① If the controller is in cooling or dry mode, after the sleep function is started, Tpreset will be increased but it won't increase over 3℃. Then the unit will run at the increased temperature.

② If the controller is in heating mode, after the sleep function is started, Tpreset will be decreased and it won't decrease over 3℃. Then the unit will run at the decreased temperature.

3.4 Timer

Timer ON and timer OFF can be set by remote controller or buttons and the setting range is 0.5~24hrs.

3.5 Buzzer

Upon energization and operation, the buzzer will give out a beef.

3.6 Power-off Memory Function

Memory content: mode, up&dwon swing (7 statuses), right&left swing (ON/OFF), setting temperature, setting fan speed, health, light, timer. After power failure, the unit will run according to the memory content automatically when power recovered. If energize the unit after power failure and the unit is turned on before power failure, the compressor will be delayed for 3mins for protection; if the unit is turned off before power failure, the compressor won't be delayed for 3mins for protection. If the timer is reached before power failure, the unit will run according to the mode before power failure after power recovered; if the timer isn't reached, the timer will be continued and time will be recalculated.

3.7 LED Display Module Control

1. Indicator control

Indicator will be in red when the unit is in standby status and it will turn to green when the unit is turned on. When any one of the circumstances as below occurs, the green indicator will blink: compulsory heating, compulsory cooling, defrosting, antifreezing protection, overcurrent protection, high/low voltage protection of compressor, high temperature protection of discharge pipe.

2. Use the light button on remote controller to turn off the LED display: When cancel the "light" by remote controller, the complete display screen will go out except the running indicator.

3.8 Buttons

① ON/OFF button: This button is used for control the on/off of controller. After each pressing of this button, the on/off status will be changes for once.

② Mode button: After pressing the mode button, it will be selected and display as: auto—cooling—drying—fan—heating (not available for cooling only unit).

③ +and – buttons: This two buttons are used for adjusting temperature and timer;

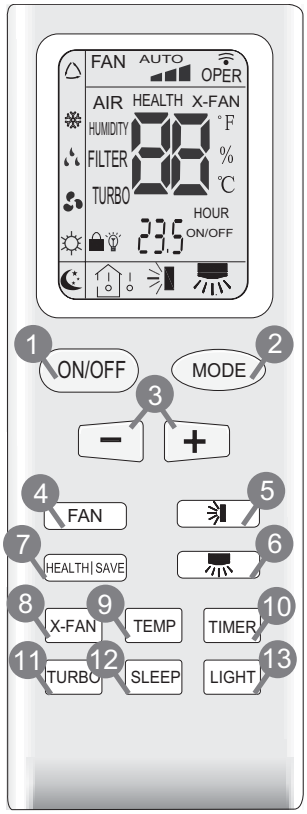
④ Up&down button: This button is used for control the up&down swing motor and it will be selected and displayed as: angle 1→angle 2→angle 3 →angle 4→angle 5→to-and-fro swing →stop swing.

⑤ Fan speed button: fan speed will be selected as: auto—low—medium—high—super-high;

⑥ Right&left swing button: This button is used for control the on/off of right&left swing motor. After each pressing this button, the on/off status of the right&left swing motor will be changed for once.

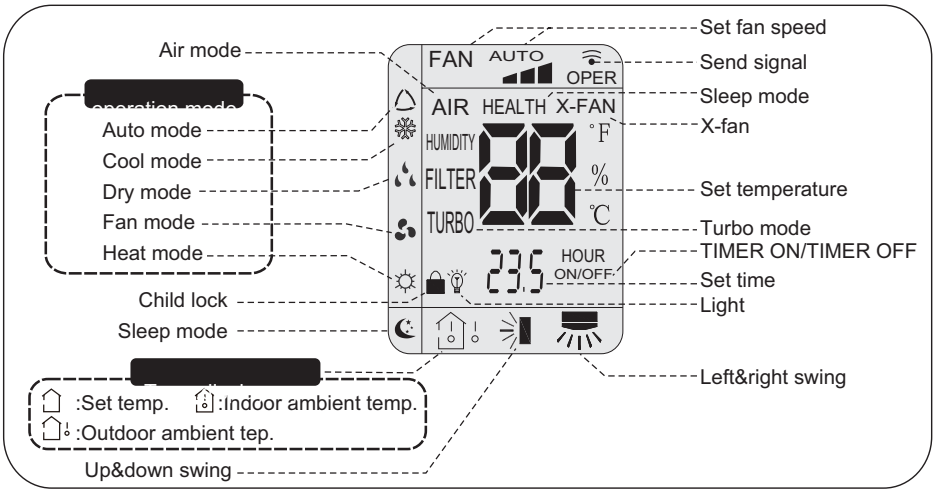
6.3 Remote Controller Introduction

Buttons on Remote Controller



1. **ON/OFF Button**
2. **MODE Button**
3. **+/- Button**
4. **FAN Button**
5. **Button**
6. **Button**
7. **HEALTH|SAVE Button**
8. **X-FAN Button**
   (Note: X-FAN is the same with BLOW.)
9. **TEMP Button**
10. **TIMER Button**
11. **TURBO Button**
12. **SLEEP Button**
13. **LIGHT Button**

Introduction for Icons on Display Screen



Introduction for Buttons on Remote Controller

Note:

• After putting through the power, the air conditioner will give out a sound. Operation indictor " ⏻ " is ON (red indicator). After that, you can operate the air conditioner by using remote controller.

• At ON status, after each pressing button on remote controller, the signal icon“ ”on remote controller will flash once. Air conditioner will give out a sound, which indicates the signal has been sent to air conditioner.

• At OFF status, display screen on remote controller displays set temperature.

At on status, display screen on remote controller displays the corresponding startup function’s icon.

1. ON/OFF Button

Press this button can turn on or turn off the air conditioner. After turning on the unit, operation indicator " ⏻ "on indoor unit is ON (green indicator. Color may be different for different models) and indoor unit gives out a sound.

2. MODE Button

Press this button to select your required operation mode.

• After selecting auto mode, air conditioner will operate automatically according to ambient temperature. Set temperature can't be adjusted and also can't be displayed. Press "FAN" button can adjust fan speed. Press" "button and" "button can adjust swing angle

• After selecting cool mode, air conditioner operates under cool mode. Cool indicator" "on indoor unit is ON. You can press "+" or "-" button to adjust set temperature. Press "FAN" button can adjust fan speed. Press" "button and" "button can adjust swing angle.

• After selecting dry mode, air conditioner operates under dry mode at low speed. Dry indicator" "on indoor unit is ON. Under dry mode, fan speed can't be adjusted. Press" "button and" "button to adjust swing angle.

• After selecting fan mode, air conditioner operates only under fan mode, All mode indicators on indoor unit is OFF. Press "FAN" button can adjust fan speed. Press" "button and" "button to adjust swing angle.

• After selecting heat mode, air conditioner operates under heat mode. Heat indicator" "on indoor unit is ON. You can press "+"or "-" button to adjust set temperature. Press "FAN" button to adjust fan speed. Press" "button and" "button to adjust swing angle. (Cooling only unit can't receive the signal for heating mode.)

Note: For preventing cold wind, after starting up heating mode, indoor fan will blow fan after delaying 1-5min. (Details time is decided by indoor ambient temperature)

Temperature setting range on remote controller: 16℃ -30℃ . Fan speed setting range: auto, low speed, medium speed and high speed.

3. "+"or "-" button

• After each pressing of "+"or "-" button, it can increase or decrease set temperature 1℃ . Hold "+"or "-" button, 2s later, set temperature on remote controller will change quickly. After reaching to your required time, loosen the button. Temperature indicator on indoor unit will also change accordingly. (Temperature can't be adjusted under auto mode)

• Under TIMER ON, TIMER OFF or Clock setting, you can press "+"or "-" button to adjust time. (Refer to TIMER button for details)

4. FAN button

Press this button you can select the fan speed in sequence: auto (AUTO),low speed( ), medium speed,)high speed( ).

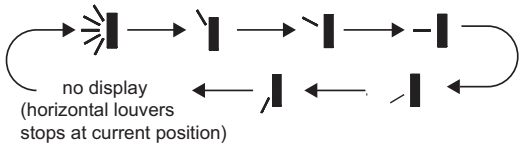
Note:

• Under auto mode, air conditioner will select proper fan speed according to ex-factory setting automatically. Air conditioner will select proper fan speed according to ex-factory setting automatically.

• Low speed under dry mode.

5. button

Press this button can select up&down swing. Swing angle can be selected in sequence as below:



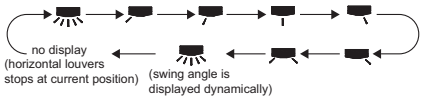
When selecting" "with remote controller, it's auto swing. Horizontal louver of air conditioner will swing up&down automatically at the maximum angle.

When selecting" 、 、 、 、 "with remote controller, it's the fixed position swing. Horizontal louver of air conditioner will stop at that position as shown by the icon to swing.

Under unit off status, press "+" button and button simultaneously to switch between simple swing setting and fixed-angle swing setting. During switching the two swing settings, icon will blink for 2s.

6. button

Press this button can select left&right swing. Swing angle can be selected circularly in sequence as below:



When selecting" "with remote controller, it's auto swing. Horizontal louver of air conditioner will swing left&right automatically at the maximum angle.

When selecting" "with remote controller, it's the fixed position swing. Horizontal louver of air conditioner will stop at that position as shown by the icon to swing.

When selecting" (swing angle is displayed dynamically) "it's the circulating swing. Horizontal louver of air conditioner will swing circularly according to the angle as shown by the icon.

Under unit off status, press "+" button and button simultaneously to switch between simple swing setting and fixed-angle swing setting. During switching the two swing settings, icon will blink for 2s.

7.HEALTH/SAVE button

HEALTH FUNCTION:

After pressing HEALTH button, remote controller will switch circularly as below:

"HEALTH"→ "AIR" → "AIR HEALTH" → "no display"

When selecting "HEALTH" by remote controller, HEALTH function will be started up.

When selecting "AIR" by remote controller, AIR function will be started up.

When selecting "AIT HEALTH", AIR and HEALTH function will be started up.

When there's no display on remote controller, AIR and HEALTH function will be turned off.

SAVE function:

Under cool mode, press SAVE button and the unit will operate under SAVE mode. Dual-8 nixie tube on remote controller displays "SE". Air conditioner will operate at auto speed. Set temperature can't be adjusted. Press SAVE button again to exit SAVE mode. Air conditioner turn back to original set speed and set temperature.

8. X-FAN button

After pressing this button under cooling or dry mode, remote controller displays the character of "X-FAN" and X-FAN function is started up. Press this button again to cancel X-FAN function. The character of "X-FAN" will disappear.

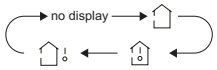
Note:

• After starting up X-FAN function, when turning off the unit, indoor fan will continue to operate for a while at low speed to dry the residual water inside the indoor unit.

• When the unit operates under X-FAN mode, press "X-FAN" button can turn off X-FAN function. Indoor fan stops operation immediately.

9. TEMP button

Press this button can see indoor set temperature, indoor ambient temperature or outdoor ambient temperature on indoor unit's display. Temperature is set circularly by remote controller as below:



When selecting" "by remote controller or no display, temperature indicator on indoor unit displays set temperature;

When selecting" "by remote controller, temperature indicator on indoor unit displays indoor ambient temperature;

When selecting" "by remote controller, temperature indicator on indoor unit displays outdoor ambient temperature.

Note:

• Outdoor ambient temperature display may can't be selected for some models. When indoor unit receives" "signal, it displays indoor set temperature.

• Only for the model whose indoor unit has dual-8 display.

10. TIMER button

• At ON status, press this button once can set TIMER OFF. The character of HOUR and OFF will flash. Press "+" or "-" button within 5s can adjust the time of TIMER ON. After each pressing of "+" or "-" button, time will increase or decrease half an hour. When holding "+" or "-" button, 2s later, the time will change quickly until to reach to your required time. After that, press "TIMER" button to confirm it. The character of HOUR and OFF won't flash again.

Cancel TIMER OFF: Press "TIMER" button again under TIMER OFF status.

• At OFF status, press this button once can set TIMER ON. Please refer to TIMER off for detailed operation.
Cancel TIMER ON: Press “TIMER” button again under TIMER ON status.

Note:

• Time setting range: 0.5-24 hours.

• Time interval between two operations can’t exceed 5s. Otherwise, remote controller will exit the setting status automatically.

11. TURBO button

When pressing this button under cooling or heating mode, air conditioner will enter into quick cooling or quick heating mode. The character of “TURBO” is displayed on remote controller. Press this button again to exit turbo function and the character of “TURBO” will be disappeared on remote controller.

12. SLEEP button

Press this button under cooling, heating or drying mode can start up sleep function“ ”icon will be displayed on remote controller. Press this button again to cancel sleep function“ ”icon on remote controller will be displayed.

13. LIGHT button

Press this button can turn off the light for indoor unit’s display“ ”icon on remote controller will disappear. Press this button again to turn on the light for indoor unit’s display“ ”icon on remote controller will be displayed.

Function Introduction for Combination Buttons

Child lock function:

Press “+” and “-” buttons simultaneously can turn on or turn off child lock function. When child lock function is started up“ ”icon will be displayed on remote controller. If operate remote controller“ ”icon will flash three times, while remote controller won’t send signal.

Switchover function for temperature display:

After turning off the unit by remote controller, press “-” button and “MODE” button simultaneously to switch between ℃ and ℉ .

Operation Guide

1. After putting through the power, press “ON/OFF” button on remote controller to turn on the air conditioner.
2. Press "MODE" button to select your required mode:AUTO,COOL,DRY,FAN,HEAT.
3. Press “+” or “-“ button to set your required temperature. (Temperature can’t be adjusted under auto mode).
4. Press ‘FAN” button to set your required fan speed: auto, low, medium and high speed.
5. Press “ ”button and“ ”button to select fan blowing angle.

Replacement of Batteries in Remote Controller

1.Press the back side of remote controller marked with“ OPEN ”as shown in the fig, and then push out the cover of battery box along the arrow direction.

2. Replace two 7# (AAA 1.5V) dry batteries, and make sure the position of “+” polar and “-“ polar are correct.
3. Reinstall the cover of battery box.

Note:

● During operation, point the remote control signal sender at the receiving window on indoor unit.

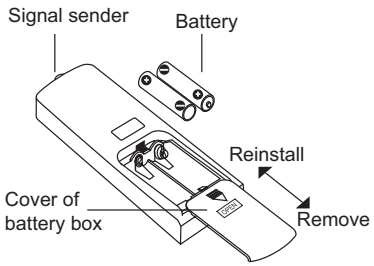
● The distance between signal sender and receiving window should be no more than 8m, and there should be no obstacles between them.

● Signal may be interfered easily in the room where there is fluorescent lamp or wireless telephone; remote controller should be close to indoor unit during operation.

● Replace new batteries of the same model when replacement is required.

● When you don’t use remote controller for a long time, please take out the batteries.

● If the display on remote controller is fuzzy or there’s no display, please replace batteries.



Part Ⅱ : Installation and Maintenance

7. Notes for Installation and Maintenance

Safety Precautions: Important!

Please read the safety precautions carefully before installation and maintenance.
The following contents are very important for installation and maintenance.

Please follow the instructions below.

●The installation or maintenance must accord with the instructions.
●Comply with all national electrical codes and local electrical codes.
●Pay attention to the warnings and cautions in this manual.
●All electric work must be performed by a licensed technician according to local regulations and the instructions given in this manual.
●Be caution during installation and maintenance. Prohibit incorrect operation to prevent electric shock, casualty and other accidents.

Warnings

Electrical Safety Precautions:

1. Cut off the power supply of air conditioner before checking and maintenance.
2. The air condition must apply specialized circuit and prohibit share the same circuit with other appliances.
3. The air conditioner should be installed in suitable location and ensure the power plug is touchable.
4. Make sure each wiring terminal is connected firmly during installation and maintenance.
5. Have the unit adequately grounded. The grounding wire can't be used for other purposes.
6. Must apply protective accessories such as protective boards, cable-cross loop and wire clip.
7. The live wire, neutral wire and grounding wire of power supply must be corresponding to the live wire, neutral wire and grounding wire of the air conditioner.
8. The power cord and power connection wires can't be pressed by hard objects.
9. If power cord or connection wire is broken, it must be replaced .
10. If the power cord or connection wire is not long enough, please get the specialized power cord or connection wire from the manufacture or distributor. Prohibit prolong the wire by yourself.
11. For the air conditioner without plug, an air switch must be installed in the circuit. The air switch should be all-pole parting and the contact parting distance should be more than 3mm.
12. Make sure all wires and pipes are connected properly and the valves are opened before energizing.
13. Check if there is electric leakage on the unit body. If yes, please eliminate the electric leakage.
14. Replace the fuse with a new one of the same specification if it is burnt down; don't replace it with a cooper wire or conducting wire.
15. If the unit is to be installed in a humid place, the circuit breaker must be installed.

Installation Safety Precautions:

1. Select the installation location according to the requirement of this manual.(See the requirements in installation part)
2. Handle unit transportation with care; the unit should not be carried by only one person if it is more than 20kg.
3. When installing the indoor unit and outdoor unit, a sufficient fixing bolt must be installed; make sure the installation support is firm.
4. Ware safety belt if the height of working is above 2m.
5. Use equipped components or appointed components during installation.
6. Make sure no foreign objects are left in the unit after finishing installation.

Refrigerant Safety Precautions:

1. Avoid contact between refrigerant and fire as it generates poisonous gas; Prohibit prolong the connection pipe by welding.
2. Apply specified refrigerant only. Never have it mixed with any other refrigerant. Never have air remain in the refrigerant line as it may lead to rupture or other hazards.
3. Make sure no refrigerant gas is leaking out when installation is completed.
4. If there is refrigerant leakage, please take sufficient measure to minimize the density of refrigerant.
5. Never touch the refrigerant piping or compressor without wearing glove to avoid scald or frostbite.

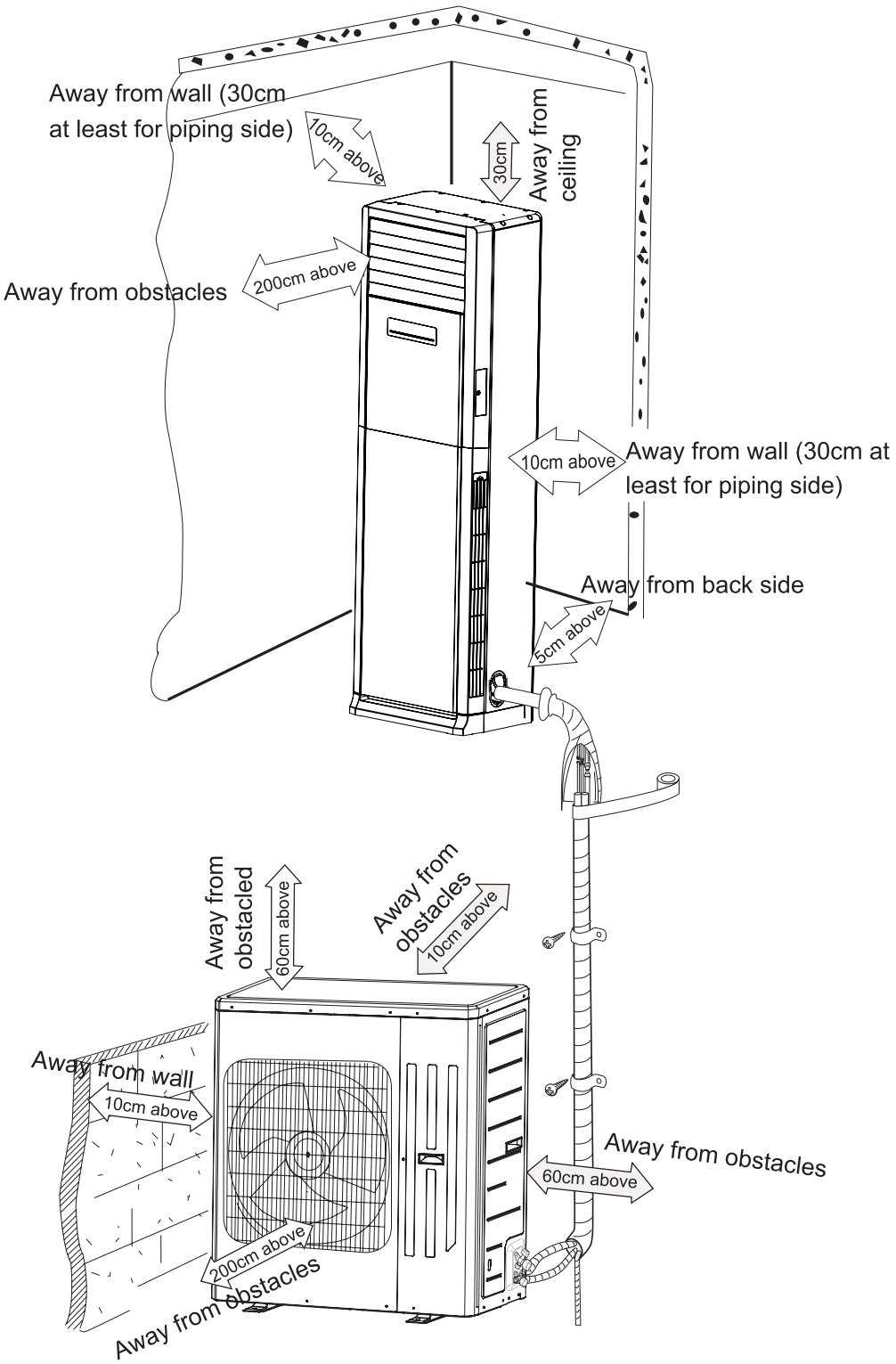
Improper installation may lead to fire hazard, explosion, electric shock or injury.

Main Tools for Installation and Maintenance

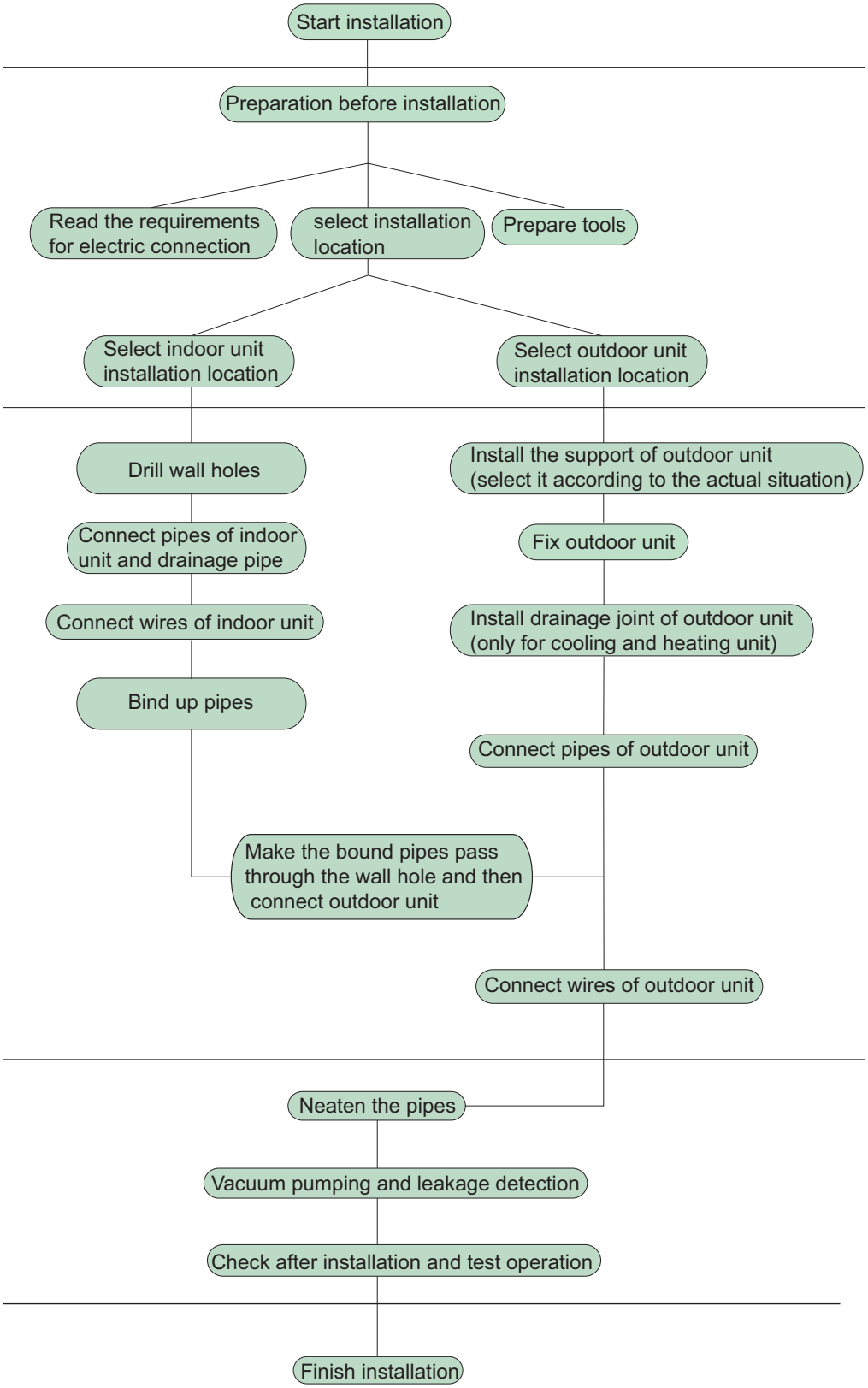
1. Measuring tape 	**2. Screw driver** 	**3. Impact drill, drill head, electric drill**
4. Electroprobe 	**5. Universal meter** 	**6. Torque wrench, open-end wrench, inner hexagon spanner**
7. Electronic leakage detector 	**8. Vacuum pump** 	**9. Pressure meter**
10. Pipe pliers, pipe cutter 	**11. Pipe expander, pipe bender** 	**12. Soldering appliance, refrigerant container**

8. Installation

8.1 Installation Dimension Diagram



Installation Procedures


Start installation
Preparation before installation
Read the requirements for electric connection
select installation location
Prepare tools
Select indoor unit installation location
Select outdoor unit installation location
Drill wall holes
Connect pipes of indoor unit and drainage pipe
Connect wires of indoor unit
Bind up pipes
Install the support of outdoor unit (select it according to the actual situation)
Fix outdoor unit
Install drainage joint of outdoor unit (only for cooling and heating unit)
Connect pipes of outdoor unit
Make the bound pipes pass through the wall hole and then connect outdoor unit
Connect wires of outdoor unit
Neaten the pipes
Vacuum pumping and leakage detection
Check after installation and test operation
Finish installation

Note: this flow is only for reference; please find the more detailed installation steps in this section.

8.2 Installation Parts-Checking

No.	Name	No.	Name
1	Indoor unit	7	Sealing gum
2	Outdoor unit	8	Wrapping tape
3	Connection pipe	9	Support of outdoor unit
4	Drainage pipe	10	Fixing screw
5	Connecting cable(power cord)	11	Drainage plug(cooling and heating unit)
6	Wall pipe	12	Owner's manual, remote controller

⚠ **Note:**

1.Please contact the local agent for installation.

2.Don't use unqualified power cord.

8.3 Selection of Installation Location

Basic Requirement:

Installing the unit in the following places may cause malfunction. If it is unavoidable, please consult the local dealer:

1.The place with strong heat sources, vapors, flammable or explosive gas, or volatile objects spread in the air.

2.The place with high-frequency devices (such as welding machine, medical equipment).

3. The place near coast area.

4.The place with oil or fumes in the air.

5.The place with sulfureted gas.

6.Other places with special circumstances.

Indoor Unit:

1. Avoid installing the indoor unit in a place where generated or leaked inflammable gas will stay.

2. Avoid installing the indoor unit in a moist place or in a place where oil may be splashed on the unit.

3. Select a location where outlet air may reach each corner of the room.

4. Select a location where connection pipe can be led to outdoor conveniently.

5. Select a location where air inlet and outlet won't be blocked.

6. Select a location with least affection of outdoor air.

7. Select a location with firm and flat floor.

8. Retain sufficient space for maintenance and installation.

9. Ensure the installation meets the requirement of installation dimension diagram.

10.Keep it away from fluorescent lamp.

Outdoor Unit:

1. Select a location where the noise and outflow air emitted by the outdoor unit will not affect neighborhood.

2. The location should be well ventilated and dry, in which the outdoor unit won't be exposed directly to sunlight or strong wind.

3. The location should be able to withstand the weight of outdoor unit.

4. Make sure that the installation follows the requirement of installation dimension diagram.

5. Select a location which is out of reach for children and far away from animals or plants. If it is unavoidable, please add fence for safety purpose.

6. The height difference between indoor unit and outdoor unit should be within 5m. The length of connection pipe should be within 10m.

8.4 Electric Connection Requirement

⚠ **Safety Precaution:**

1. Must follow the electric safety regulations when installing the unit.

2. According to the local safety regulations, use qualified power supply circuit and air switch.

3. The air switch must have the functions of magnetic tripping and heat tripping in order to prevent short circuit or overload. Please install the air switch with suitable capacity according to the sheet below.

Model	Capacity of air switch
48K	16A

4. Make sure the power supply matches with the requirement of air conditioner. Unstable power supply or incorrect wiring may result in electric shock, fire hazard or malfunction. Please install proper power supply cables before using the air conditioner.

5. Properly connect the live wire, neutral wire and grounding wire of power socket.

6. Be sure to cut off the power supply before proceeding any work related to electric safety.

7. Do not put through the power before finishing installation.

⚠ **Grounding Requirement:**

1. The air conditioner is first class electric appliance. It must be properly grounded with specialized grounding device by a professional. Please make sure it is always grounded effectively, otherwise it may cause electric shock.

2. The yellow-green wire in air conditioner is grounding wire, which can't be used for other purposes.

3. The grounding resistance should comply with national electric safety regulations.

8.5 Installation of Indoor Unit

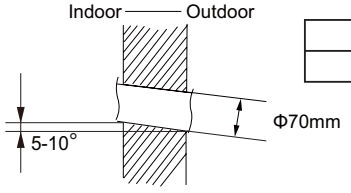
Step one: Choosing Installation location

Recommend the installation location to the client and then confirm it with the client.

Step two: open piping hole

1.Choose the position of piping hole according to the direction of outlet pipe.

2.Open a piping hole with the diameter of Φ70mm on the selected outlet pipe position. In order to drain smoothly, slant the piping hole on the wall slightly downward to the outdoor side with the gradient of 5-10°. (As show in Fig.1)



Model	Piping hole
48K	Φ70mm

Fig.1

⚠ **Note:**

1.Pay attention to dust prevention and take relevant safety measures when opening the hole.
2.The plastic expansion particles are not provided and should be bought locally.

Step three: outlet pipe

1. The pipe can be led out in the direction of left, right or rear. (As show in Fig.2)

2. After confirming the direction of outlet pipe, loosen the screws at the upper and lower adjusting baffle to let the connection pipe/drain pipe connects the indoor unit. (As show in Fig.3)

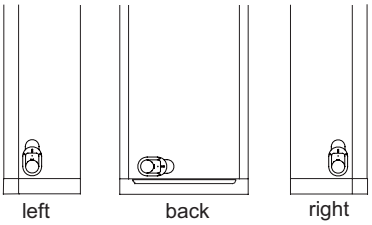


Fig.2

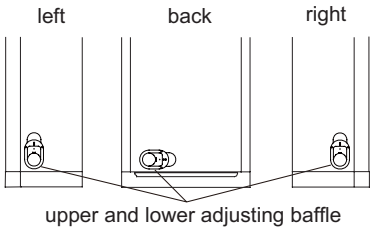


Fig.3

Step four: connect the pipe of indoor unit

1. Take out the left and right screw cover and then remove the screws on air-inlet panel to remove the panel.(As show in Fig.4)

2. Aim the pipe joint at the corresponding bellmouth.(As show in Fig.5)

3. Pretightening the union nut with hand.

4. Adjust the torque force by referring to the following sheet. Place the open-end wrench on the pipe joint and place the torque wrench on the union nut. Tighten the union nut with torque wrench.(As show in Fig.6)

5. Wrap the indoor pipe and joint of connection pipe with insulating pipe, and then wrap it with tape. (As show in Fig.7)

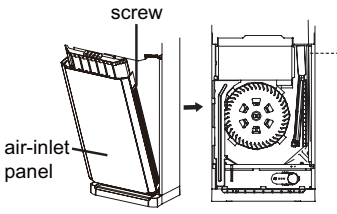


Fig.4

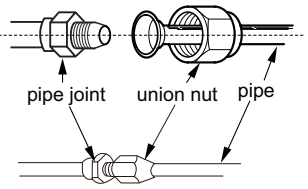


Fig.5

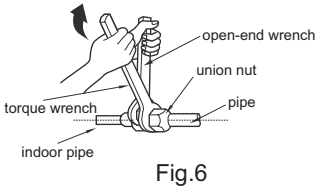


Fig.6

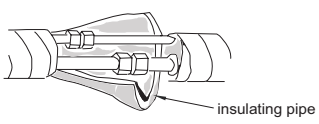


Fig.7

Refer to the following table for wrench moment of force:

Hex nut diameter(mm)	Tightening torque(N·m)
Φ6(1/4")	15~20
Φ9.52(3/8")	30~40
Φ12(1/2")	45~55
Φ16(5/8")	60~65
Φ19(3/4")	70~75

Step five: install drain hose

1. Connect the drain hose to the outlet pipe of indoor unit.(As show in Fig.8)

2. Bind the joint with tape.(As show in Fig.8)

3.Add insulating pipe in the indoor drain hose in order to prevent condensation.(As show in Fig.10)

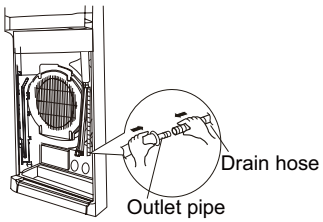


Fig.8

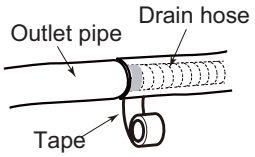


Fig.9

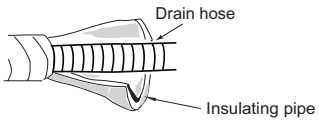


Fig.10

Step six: connect wire of indoor unit

1. Make the power connection wire go through the cable-cross hole of indoor unit(As show in Fig.11)

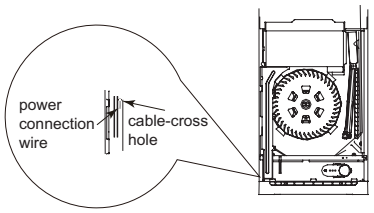
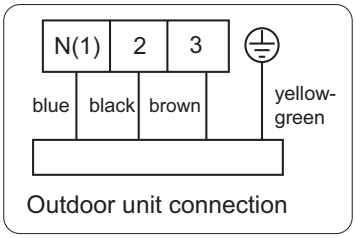


Fig.11

2. Remove the wire clip; connect the power connection wire to the wiring terminal according to the color; tighten the screw and then fix the power connection wire with wire clip.(As show in Fig.12)



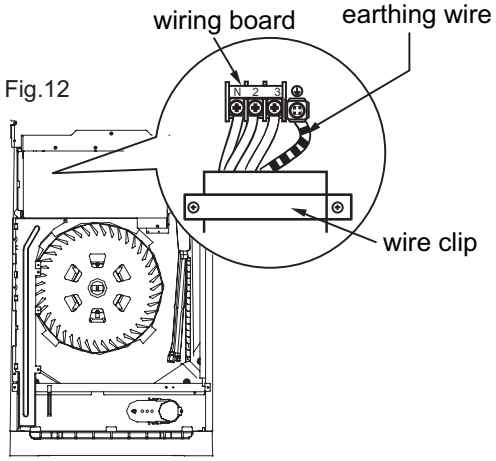


Fig.12

Note: the wiring connection is for reference only, please refer to the actual one.

4. Adjust the position of upper and lower adjusting baffle; clamp the connection pipe and drain pipe as firm as possible.

5. Tighten the screws.

⚠ Note:

All wires of indoor unit and outdoor unit should be connected by a professional.

1.If the length of power connection wire is insufficient, please contact the supplier for a new one. Avoid extending the wire by yourself.

2.For the air conditioner with plug, the plug should be reachable after finishing installation.

3.For the air conditioner without plug, an air switch must be installed in the line. The air switch should be all-pole parting and the contact parting distance should be more than 3mm.

Step seven: bind up pipe

1. Bind up the connection pipe, power cord and drain hose with the band.(As show in Fig.14)

2.Reserve a certain length of drain hose and power cord for installation when binding them. When binding to a certain degree, separate the indoor power and then separate the drain hose.(As show in Fig.15)

3. Bind them evenly.

4. The liquid pipe and gas pipe should be bound separately at the end.

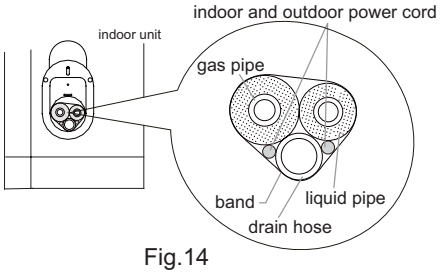


Fig.14

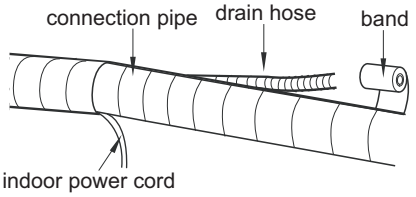


Fig.15

⚠ **Note:**

1.The power cord and control wire can't be crossed or winding.

2.The drain hose should be bound at the bottom.

Step eight: place the indoor unit

1.Put the bound pipes in the wall pipe and then make them pass through the wall hole.

2. Stuff the gap between pipes and wall hole with sealing gum. (As show in Fig.16)

3. Fix the wall pipe.

4.Check if the indoor unit is installed firmly.

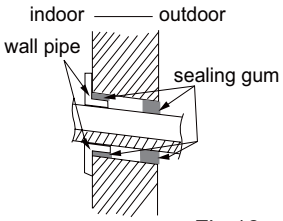


Fig.16

⚠ **Note:**

Do not bend the drain hose too excessively in order to prevent blocking.

8.6 Installation of Outdoor Unit

Step one: fix the support of outdoor unit (select it according to the actual installation situation)

1. Select installation location according to the house structure.

2. Fix the support of outdoor unit on the selected location with expansion screws.

⚠ **Note:**

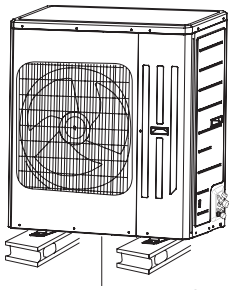
1.Take sufficient protective measures when installing the outdoor unit.

2.Make sure the support can withstand at least four times the unit weight.

3.The outdoor unit should be installed at least 3cm above the floor in order to install drain joint.(As show in Fig.17)

4.For the unit with cooling capacity of 2300W~5000W, 6 expansion screws are needed; for the unit with cooling capacity of 6000W~8000W, 8 expansion screws are needed; for the unit with cooling capacity of 10000W~16000W, 10 expansion screws are needed.

Fig.17



at least 3cm above the floor

Step two: install drain joint (only for cooling and heating unit)

1. Connect the outdoor drain joint into the hole on the chassis, as shown in the picture below.

2. Connect the drain hose into the drain vent.(As show in Fig.18)

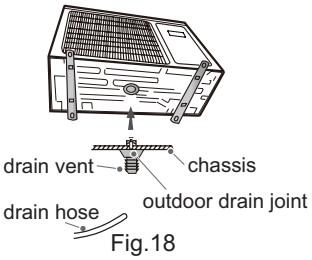


Fig.18

Step three: fix outdoor unit

1. Place the outdoor unit on the support.

2. Fix the foot holes of outdoor unit with bolts.(As show in Fig.19)

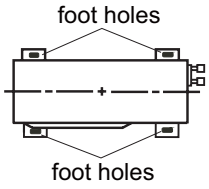


Fig.19

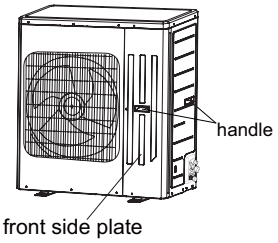


Fig.20

Step four: connect indoor and outdoor pipes

1. Remove the front side plate.(As show in Fig.20)

2. Remove the screw cap of valve and aim the pipe joint at the bellmouth of pipe.(As show in Fig.21)

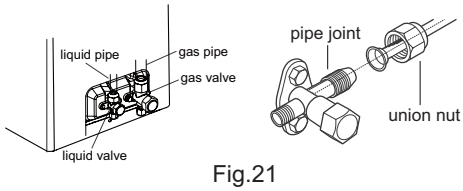


Fig.21

3. Pretightening the union nut with hand.

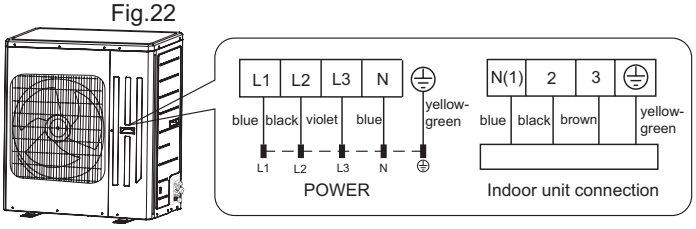
4. Tighten the union nut with torque wrench by referring to the sheet below.

Hex nut diameter(mm)	Tightening torque(N·m)
Φ6(1/4")	15~20
Φ9.52(3/8")	30~40
Φ12(1/2")	45~55
Φ16(5/8")	60~65
Φ19(3/4")	70~75

Step five: connect outdoor electric wire

1. Remove the wire clip; connect the power connection wire to the wiring terminal according to the color; fix them with screws. (As show in Fig.22)

Fig.22



Note: the wiring connection is for reference only, please refer to the actual one.

2. Fix the power connection wire with wire clip.

⚠ **Note:**

1.After tightening the screw, pull the power cord slightly to check if it is firm.

2. Never cut the power connection wire to prolong or shorten the distance.

Step six: neaten the pipes

1. The pipes should be placed along the wall, bent reasonably and hidden possibly. Min. semidiameter of bending the pipe is 10cm.

2. If the outdoor unit is higher than the wall hole, you must set a U-shaped curve in the pipe before pipe goes into the room, in order to prevent rain from getting into the room. (As show in Fig.24)

Fig.24

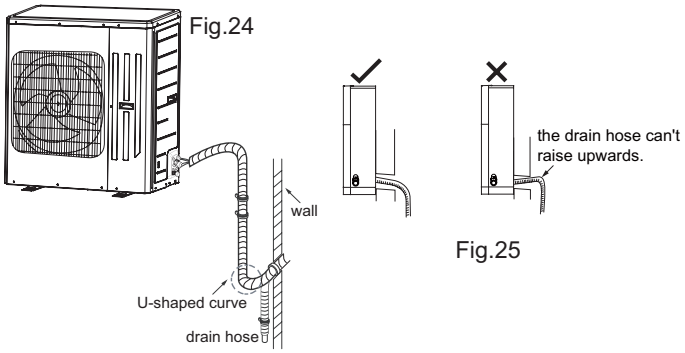


Fig.25

⚠ **Note:**

1.The through-wall height of drain hose shouldn't be higher than the outlet pipe hole of indoor unit.(As show in Fig.25)

2. Slant the drain hose slightly downwards. The drain hose can't be curved, raised and fluctuant, etc. (As show in Fig.26)

3.The water outlet can't be placed in water in order to drain smoothly.(As show in Fig.27)

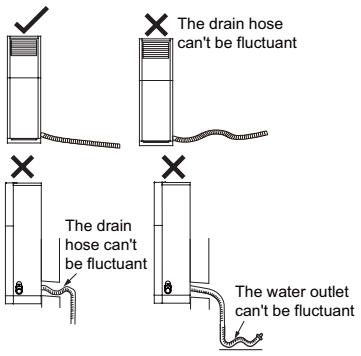


Fig.26

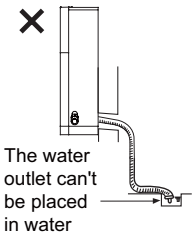


Fig.27

8.7 Vacuum Pumping and Leak Detection

Use vacuum pump

1. Remove the valve caps on the liquid valve and gas valve and the nut of refrigerant charging vent.
2. Connect the charging hose of piezometer to the refrigerant charging vent of gas valve and then connect the other charging hose to the vacuum pump.
3. Open the piezometer completely and operate for 10-15min to check if the pressure of piezometer remains in -0.1MPa.
4.Close the vacuum pump and maintain this status for 1-2min to check if the pressure of piezometer remains in -0.1MPa. If the pressure decreases, there may be leakage.
5. Remove the piezometer, open the valve core of liquid valve and gas valve completely with inner hexagon spanner.
6. Tighten the screw caps of valves and refrigerant charging vent. (As show in Fig.28)

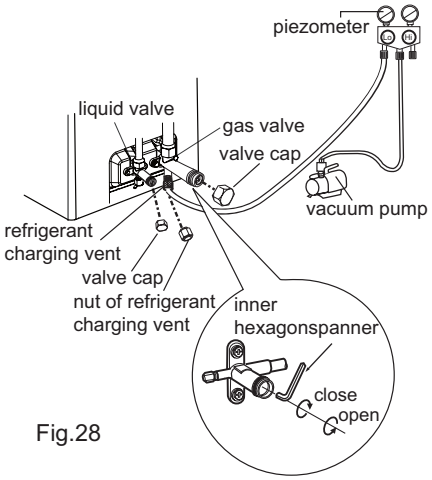


Fig.28

Leakage Detection

1. With leakage detector

Check if there is leakage with leakage detector.

2.With soap water:

If leakage detector is not available, please use soap water for leakage detection. Apply soap water at the suspected position and keep the soap water for more than 3min. If there are air bubbles coming out of this position, there's a leakage.

8.8 Check after Installation and Test Operation

1. Check after Installation

Check according to the following requirement after finishing installation.

NO.	Items to be checked	Possible malfunction
1	Has the unit been installed firmly?	The unit may drop, shake or emit noise.
2	Have you done the refrigerant leakage test?	It may cause insufficient cooling (heating) capacity.
3	Is heat insulation of pipeline sufficient?	It may cause condensation and water dripping.
4	Is water drained well?	It may cause condensation and water dripping.
5	Is the voltage of power supply according to the voltage marked on the nameplate?	It may cause malfunction or damage the parts.
6	Is electric wiring and pipeline installed correctly?	It may cause malfunction or damage the parts.
7	Is the unit grounded securely?	It may cause electric leakage.
8	Does the power cord follow the specification?	It may cause malfunction or damage the parts.
9	Is there any obstruction in air inlet and air outlet?	It may cause insufficient cooling (heating).
10	The dust and sundries caused during installation are removed?	It may cause malfunction or damaging the parts.
11	The gas valve and liquid valve of connection pipe are open completely?	It may cause insufficient cooling (heating) capacity.

2. Test Operation

(1) Preparation of test operation

The client approves the air conditioner installation.

Specify the important notes for air conditioner to the client.

(2) Method of test operation

Put through the power, press ON/OFF button on the remote controller to start operation.Press MODE button to select AUTO, COOL, DRY, FAN and HEAT to check whether the operation is normal or not.If the ambient temperature is lower than 16 ℃ , the air conditioner can't start cooling.

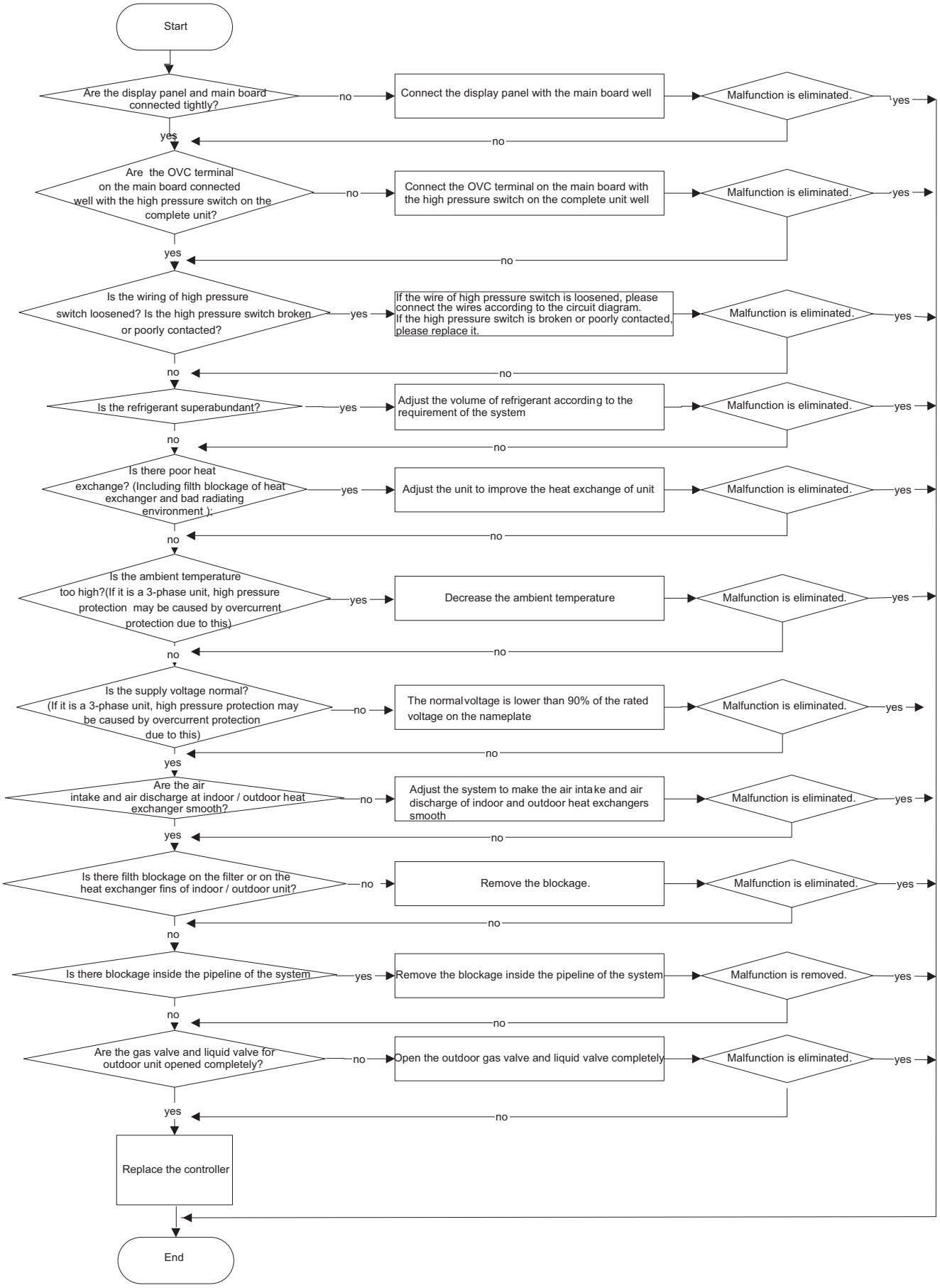
9. Maintenance

9.1 Judgement by Flashing LED of Indoor

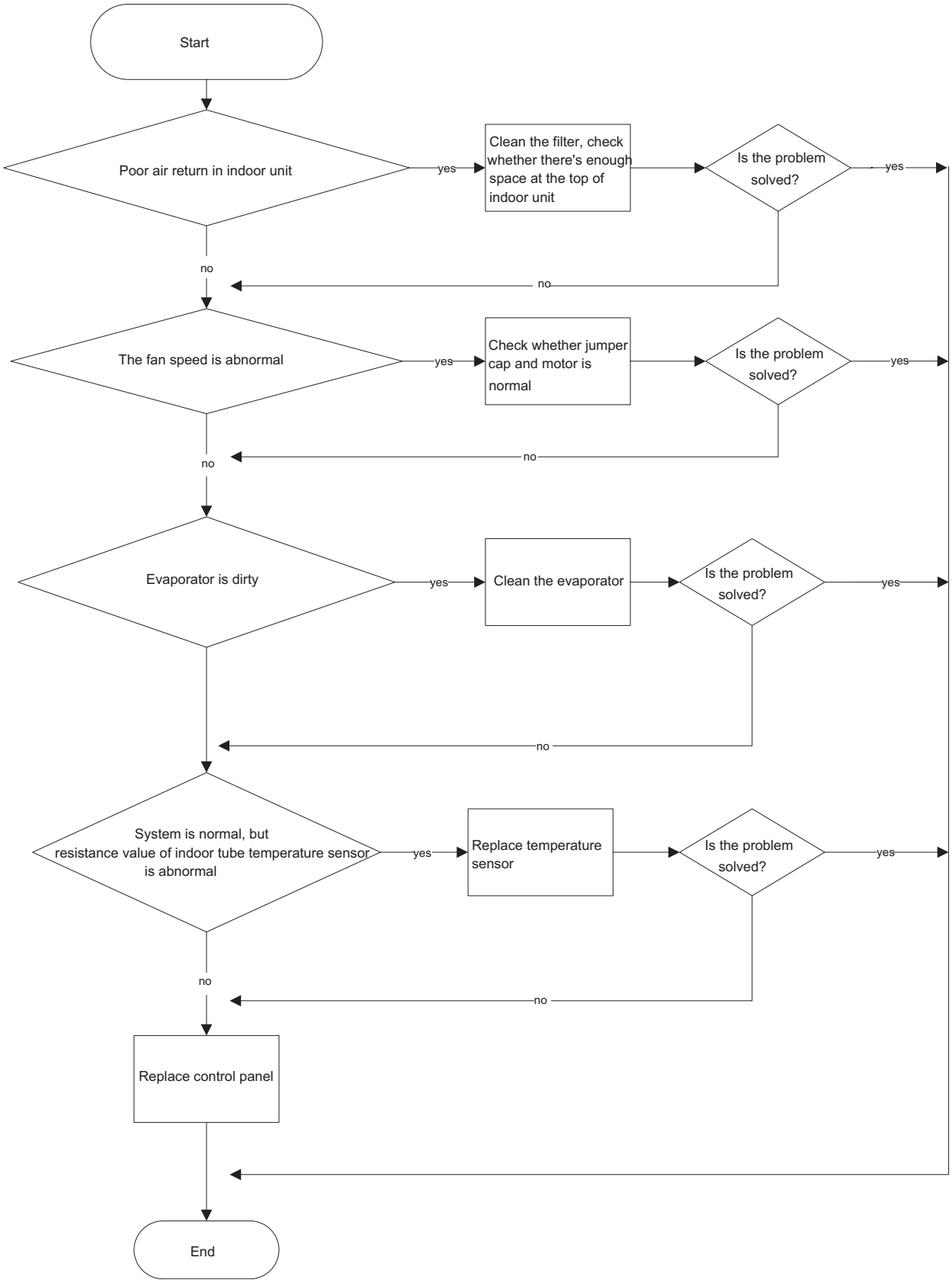
No.	Malfunction Name	Error Code	A/C Status	Possible Causes
1	High pressure protection	E1	During cooling and drying operation, except indoor fan operates, all loads stop operation. During heating operation, if it is inverter unit, the complete unit stops; if it is floor standing unit, the complete unit stops and operation of remote controller or controller is unavailable.	1. The main board and the display panel are not connected well. 2. The OVC terminal on main board is not connected well with the high pressure switch on the complete unit. 3. The wiring of high pressure switch is loosened. 4. Refrigerant is superabundant. 5. Poor heat exchange (including blocked heat exchanger and bad radiating environment). 6. Ambient temperature is too high.(if it is 3-phase unit, the high pressure protection may be caused by overcurrent protection due to this reason) 7. The supply voltage is abnormal.(if it is 3-phase unit, the high pressure protection may be caused by overcurrent protection due to this reason) 8. The air intake and air discharge at indoor / outdoor heat exchanger are not smooth. The air cycle is short circuited. 9. Filter and heat exchange fins of indoor/outdoor units are blocked. 10. The system pipeline is blocked. 11. The gas valve and liquid valve for outdoor unit are not completely opened. 12. The OVC input is at high level.
2	Freeze protection	E2	During cooling and drying operation,compressor and outdoor fan stop while indoor fan operates.	1. Poor air-return in indoor unit. 2. Abnormal fan speed. 3. Dirty evaporator. 4. System is normal, but the indoor tube temperature sensor is abnormal, or the tube temperature sensor is not connected well.
3	Low pressure protection of compressor	E3	The complete unit stops	1. The main board and display panel are not connected well. 2. The LPP terminal on the main board is not connected well with the high pressure switch on the complete unit. 3. The wiring of the high pressure switch is loosened. High pressure switch is damaged or poorly contacted. 4. Insufficient or leaking out refrigerant. 5. The LPP input is at high level.
4	High discharge temperature protection of compressor	E4	During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates. During heating operation,all loads stop.	1. Abnormal system (e.g.: blockage, etc) 2. Abnormal rotation speed of outdoor motor (cooling) 3. Abnormal air intake (cooling) 4. System is normal, but the compressor discharge temperature sensor is abnormal or poorly contacted.
5	Overcurrent protection	E5	During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates. During heating operation, all loads stop.	1. Unstable supply voltage. Normal fluctuation shall be within 10% of the rated voltage on the nameplate. 2. Supply voltage is too low and load is too high. 3. Measure the current of live wire on main board. If the current isn't higher than the overcurrent protection value, please check the controller. 4. The indoor and outdoor heat exchangers are too dirty, or the air inlet and air outlet are blocked. 5. The fan motor is not running. Abnormal fan speed: fan speed is too low or the fan doesn't run. 6. The compressor is not running normally. There is abnormal sound, oil leakage or the temperature of the shell is too high, etc. 7. There's blockage in the system. (filth blockage, ice plug, greasy blockage, Y-valve hasn't beenopened completely)

9.2 How to Check Simply the Main Part of Indoor

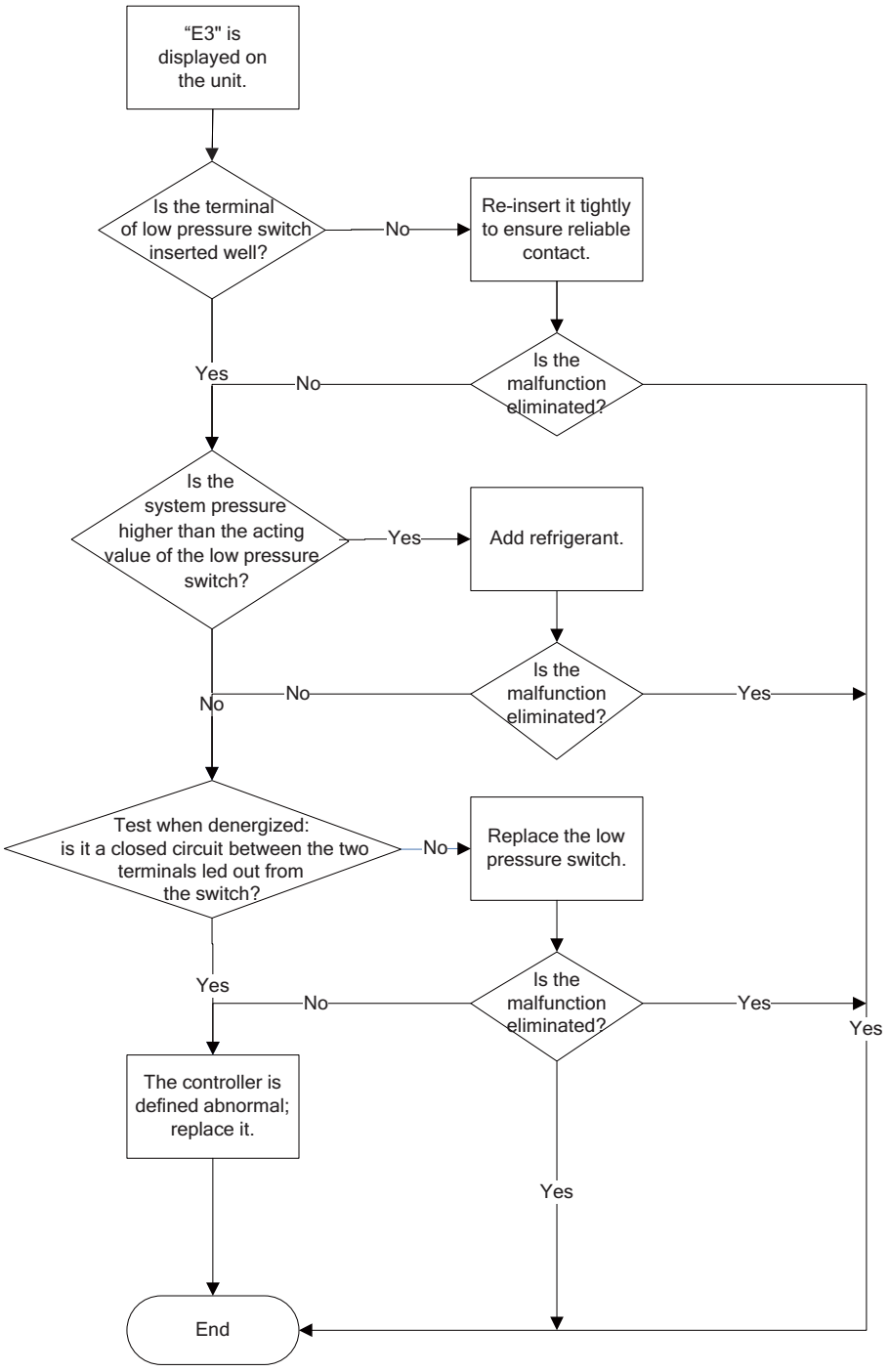
1. High pressure protection (E1)


Start
Are the display panel and main board connected tightly?
no
Connect the display panel with the main board well
Malfunction is eliminated.
yes
yes
no
Are the OVC terminal on the main board connected well with the high pressure switch on the complete unit?
no
Connect the OVC terminal on the main board with the high pressure switch on the complete unit well
Malfunction is eliminated.
yes
yes
no
Is the wiring of high pressure switch loosened? Is the high pressure switch broken or poorly contacted?
yes
If the wire of high pressure switch is loosened, please connect the wires according to the circuit diagram.
If the high pressure switch is broken or poorly contacted, please replace it.
Malfunction is eliminated.
yes
no
no
Is the refrigerant superabundant?
yes
Adjust the volume of refrigerant according to the requirement of the system
Malfunction is eliminated.
yes
no
no
Is there poor heat exchange? (Including filth blockage of heat exchanger and bad radiating environment):
yes
Adjust the unit to improve the heat exchange of unit
Malfunction is eliminated.
yes
no
no
Is the ambient temperature too high?(If it is a 3-phase unit, high pressure protection may be caused by overcurrent protection due to this)
yes
Decrease the ambient temperature
Malfunction is eliminated.
yes
no
no
Is the supply voltage normal? (If it is a 3-phase unit, high pressure protection may be caused by overcurrent protection due to this)
no
The normal voltage is lower than 90% of the rated voltage on the nameplate
Malfunction is eliminated.
yes
no
yes
Are the air intake and air discharge at indoor / outdoor heat exchanger smooth?
no
Adjust the system to make the air intake and air discharge of indoor and outdoor heat exchangers smooth
Malfunction is eliminated.
yes
yes
no
Is there filth blockage on the filter or on the heat exchanger fins of indoor / outdoor unit?
no
Remove the blockage.
Malfunction is eliminated.
yes
no
no
Is there blockage inside the pipeline of the system
yes
Remove the blockage inside the pipeline of the system
Malfunction is removed.
yes
no
no
Are the gas valve and liquid valve for outdoor unit opened completely?
no
Open the outdoor gas valve and liquid valve completely
Malfunction is eliminated.
yes
yes
no
Replace the controller
End

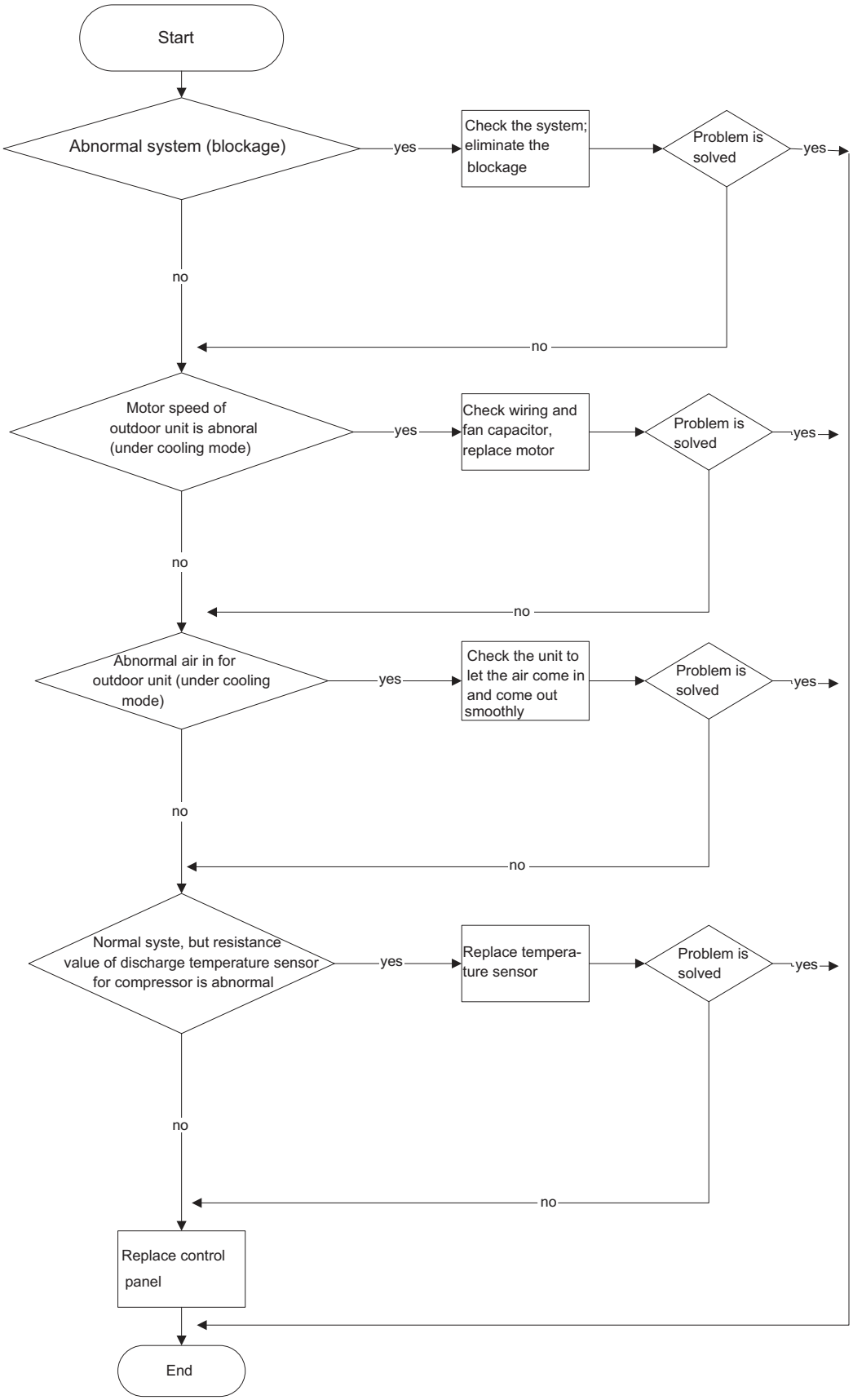
2. Freeze protection(E2)



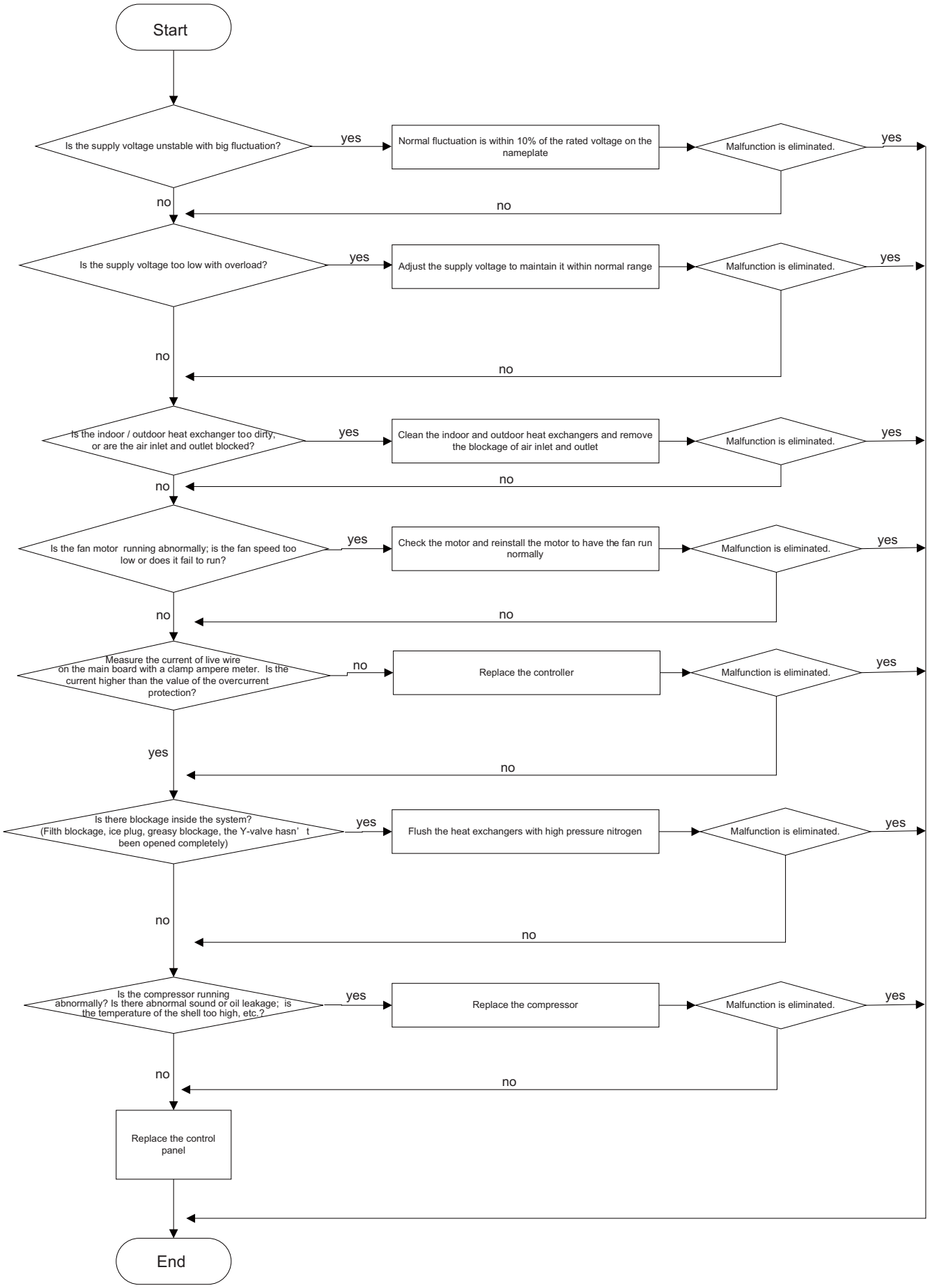
3. Low pressure protection of compressor (E3)



4. High discharge temperature protection of compressor (E4)



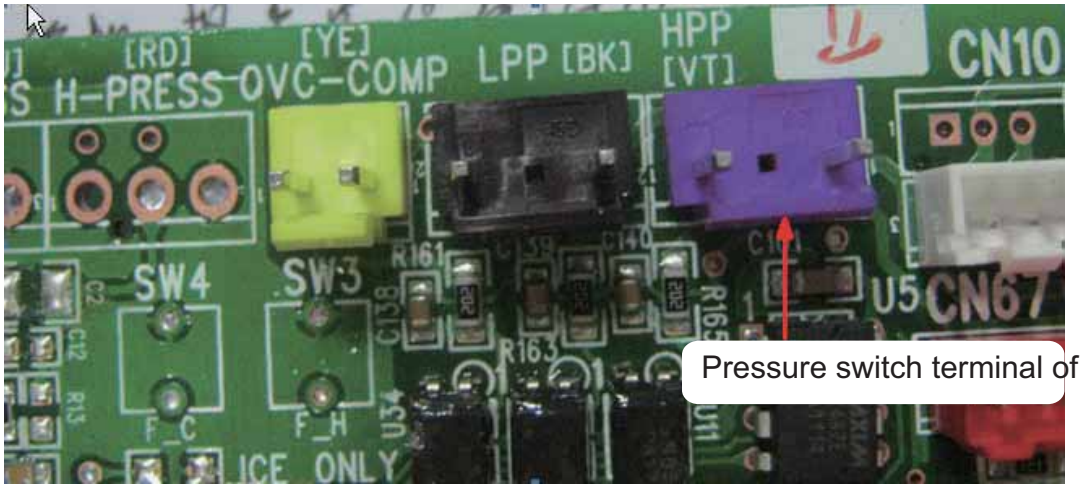
5. Overcurrent protection (E5)


Start
Is the supply voltage unstable with big fluctuation?
yes
Normal fluctuation is within 10% of the rated voltage on the nameplate
Malfunction is eliminated.
yes
no
no
Is the supply voltage too low with overload?
yes
Adjust the supply voltage to maintain it within normal range
Malfunction is eliminated.
yes
no
no
Is the indoor / outdoor heat exchanger too dirty, or are the air inlet and outlet blocked?
yes
Clean the indoor and outdoor heat exchangers and remove the blockage of air inlet and outlet
Malfunction is eliminated.
yes
no
no
Is the fan motor running abnormally; is the fan speed too low or does it fail to run?
yes
Check the motor and reinstall the motor to have the fan run normally
Malfunction is eliminated.
yes
no
no
Measure the current of live wire on the main board with a clamp ampere meter. Is the current higher than the value of the overcurrent protection?
no
Replace the controller
Malfunction is eliminated.
yes
yes
no
Is there blockage inside the system? (Filth blockage, ice plug, greasy blockage, the Y-valve hasn't been opened completely)
yes
Flush the heat exchangers with high pressure nitrogen
Malfunction is eliminated.
yes
no
no
Is the compressor running abnormally? Is there abnormal sound or oil leakage; is the temperature of the shell too high, etc.?
yes
Replace the compressor
Malfunction is eliminated.
yes
no
no
Replace the control panel
End

9.3 Judgement by Flashing LED of Outdoor

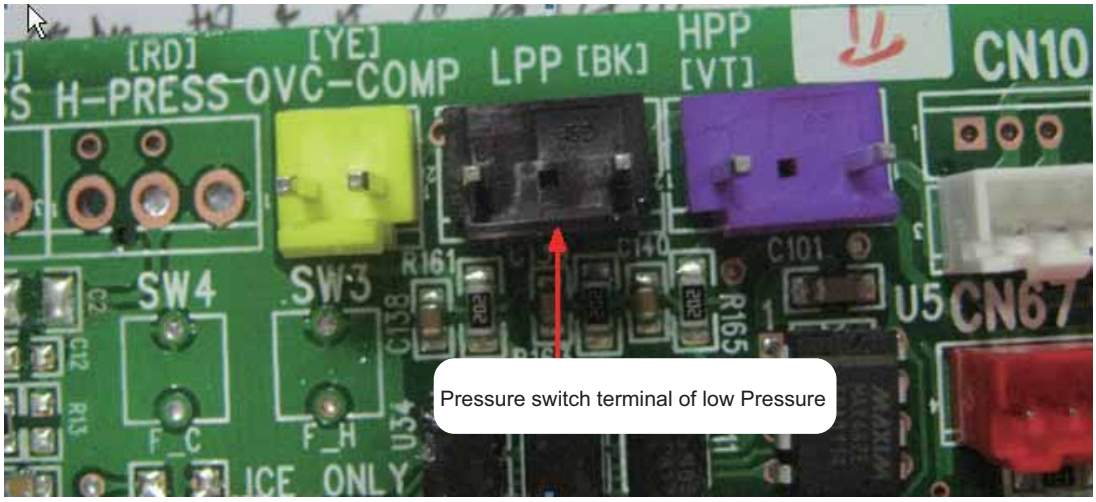
NO.	Name of malfunction	Outdoor Display Error Code
1	System high pressure protection	E1
2	Anti-freezing protection	E2
3	System low pressure protection	E3
4	Compressor exhaust high temperature protection	E4
5	Communication failure between indoor unit and outdoor unit	E6
6	Outdoor tube sensor open or short circuit	F2
7	Outdoor ambient sensor open or short circuit	F3
8	Exhaust sensor open or short circuit	F4
9	Outdoor DC fan motor malfunction	H6
10	Over compressor phase current protection	P5
11	Compressor overload protection	H3
12	IPM protection	H5
13	PFC protection	HC
14	Compressor loss step protection	H7
15	Startup failure	Lc
16	Capacitor charge malfunction	PU
17	IPM sensor circuit malfunction	P7
18	IPM high temperature protection	P8
19	Over voltage protection for PN	PH
20	Low PN voltage protection	PL
21	Current Detect Sensor malfunction	Pc
22	IPM Module Reset	P0
23	Phase Loss	Ld
24	Driver Module Communication Fail	P6
25	Charging Circuit Malfunction	PU

1. E1: High pressure protection
Malfunction description: The pressure of ODU high pressure side is too high.
Main check points:
a. Is the system pressure is normal;
b. Is the pressure switch is normal;
c. If above two issues are normal, the mainboard circuit is with malfunction, please replace mainboard.



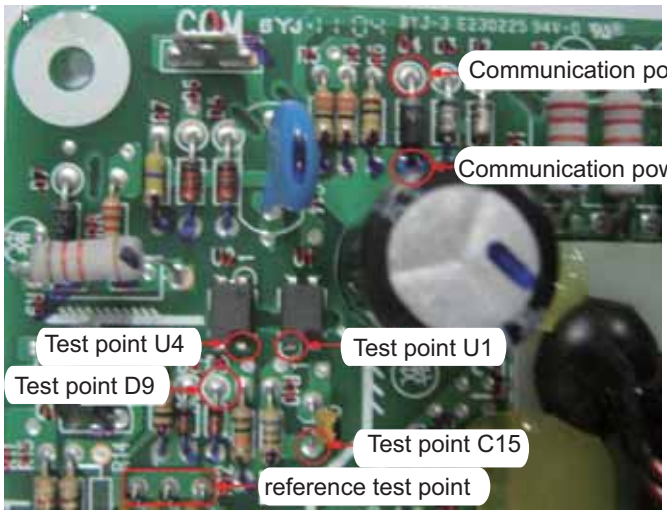
2. E2: Freeze protection
Malfunction description: Too low tube temperature of IDU under cooling mode.
Main check point:
a. Check if the IDU fan speed is normal, if the air inlet/outlet is smooth;
b. Check if the IDU, ODU heat exchanger is too dirty that affect the heat exchanging effect.

3. E3: Low pressure protection
Malfunction description: The pressure of ODU low pressure side is too low
Main check points:
a. Is the system pressure is normal;
b. Is the pressure switch is normal;
c. If above two issues are normal, the mainboard circuit is with malfunction, please replace mainboard.



4. E4: The air discharging temperature is too high
Main check points:
a. Pull off the ODU air discharging temp. sensor, check if the temp. sensor resistance value match with present temperature;
b. Check if the refrigerant is too much or too little;
c. Check if the IDU, ODU heat exchanger is too dirty that affect the heat exchanging effect.

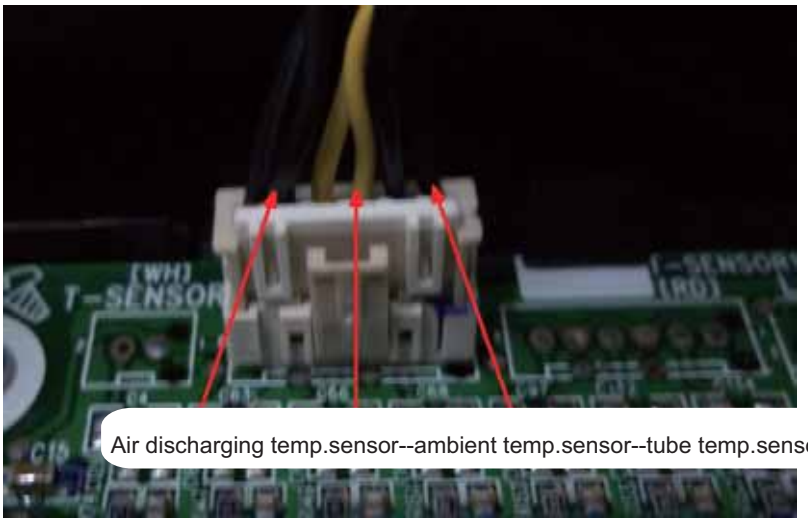
5. E6: IDU, ODU communication malfunction
Main check points:
a. Check if the wiring connection if IDU and ODU is correct;
b. Check if the filter communication power supply voltage is normal, if the DC voltage is more than 54±15%, please replace the ODU filter;
c. Measure the voltage between D9/U2/C15/U1 and the reference point, if the voltage between D9/U2 and reference point is not within 0~5V, please replace the IDU mainboard; if the voltage between U1 and reference point is not within 0~1.1V, while the voltage between C15 and reference point is not within 0~5V, please replace ODU mainboard.



6. F2: ODU tube temp. sensor open/short circuit
Malfunction description: The ODU tube temp. sensor temperature value is too high or too low that out of the normal range.
Main check points:
a. Pull off the ODU tube temp. sensor, check if the temp. sensor resistance value match with present temperature;
b. If the temp. sensor resistance is normal, please replace ODU mainboard;

7. F3: ODU ambient temp. sensor open/short circuit
Malfunction description: The ODU ambient temp. sensor temperature value is too high or too low that out of the normal range.
Main check points:
a. Pull off the ODU ambient temp. sensor, check if the temp. sensor resistance value match with present temperature;
b. If the temp. sensor resistance is normal, please replace ODU mainboard;

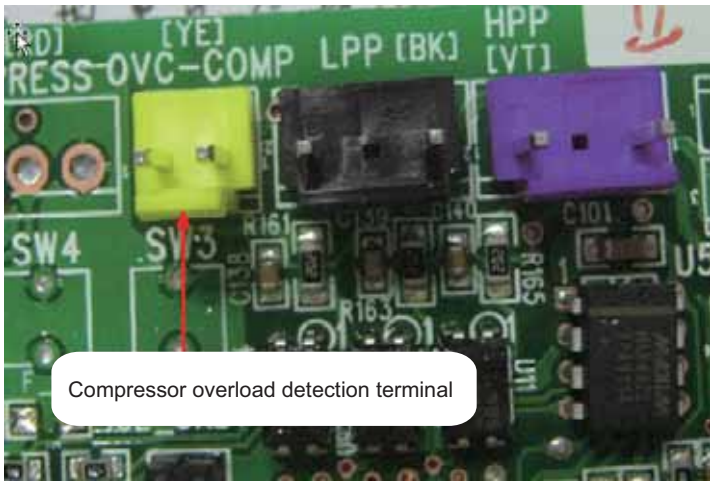
8. F4:ODU air discharging temp. sensor open, short circuit
Malfunction description: The ODU air discharging temp. sensor temperature value is too high or too low that out of the normal range.
Main check points:
a. Pull off the ODU air discharging temp. sensor, check if the temp. sensor resistance value match with present temperature;
b. If the temp. sensor resistance is normal, please replace ODU mainboard;



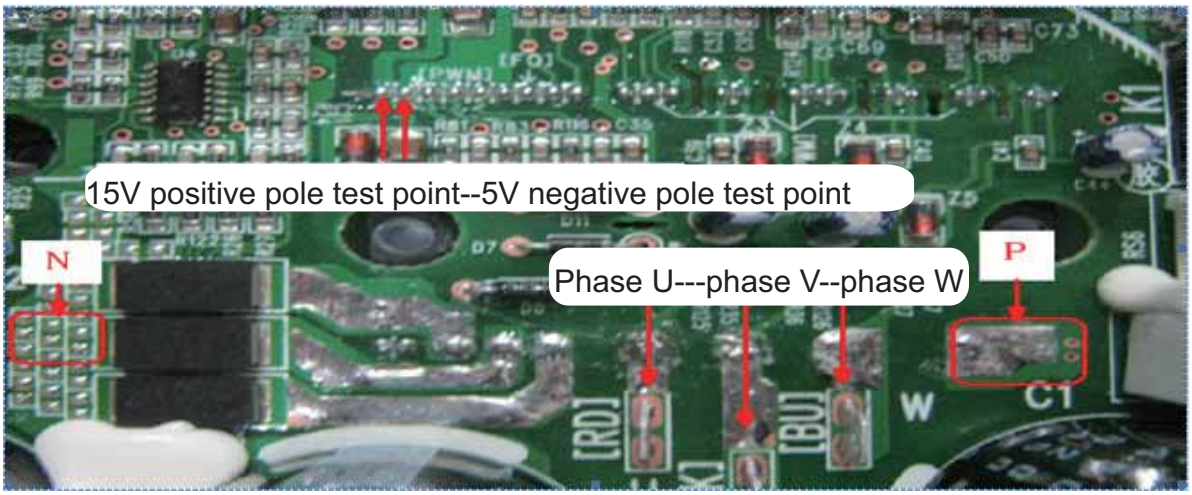
9. H6: ODU DC fan malfunction
Main check points:
a. Check if the DC fan connection terminal is well contacted.
b. If only one fan is with malfunction, please interchange the two fan terminal to see if the malfunction is eliminated. If so, the DC fan is with malfunction, please replace the DC fan, otherwise, please replace the ODU mainboard.
If all above is normal, please replace the ODU mainboard.

10. P5: Compressor phase current overcurrent protection
Malfunction description: Compressor operation current is over than the setting protection value.
Main check points:
a. Check if the indoor and outdoor ambient temperature is over than normal cooling, heating temperature range;
b. Check if the evaporator is too dirty that affect the heat exchanging effect.

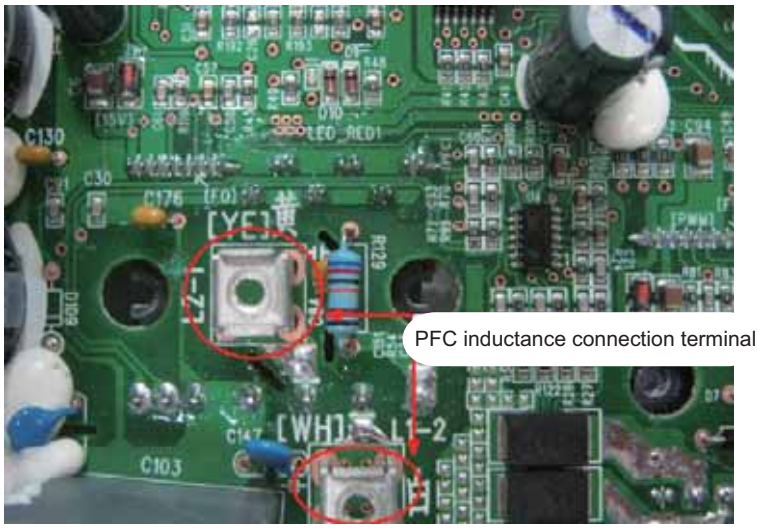
11. H3: Compressor overload protection
Malfunction description: Temperature of top compressor is over than the limit value
Main check points:
a. Normally the compressor overload protection switch is always on, check if the switch is normal.



12. H5: IPM module protection
Main check points:
a. Check if the compressor wiring connection is well connected, if the compressor wiring sequence is correct. The correct wiring sequence is yellow, blue, red in anticlockwise direction.
b. Measure if the DC voltage between D10 is around 15V, if it is less than 13.5V or more than 18V, please replace ODU mainboard.
c. Pull off the compressor connection wire, measure the impedance between phase U/V/W and P/N, if any of them is short circuit, please replace the ODU mainboard;
d. Check if the compressor is damaged, measure the resistance between any two phases of the compressor three phases. They should be almost the same, if they're with big difference, the compressor is damaged, please check the insulation condition of three phases to the case.

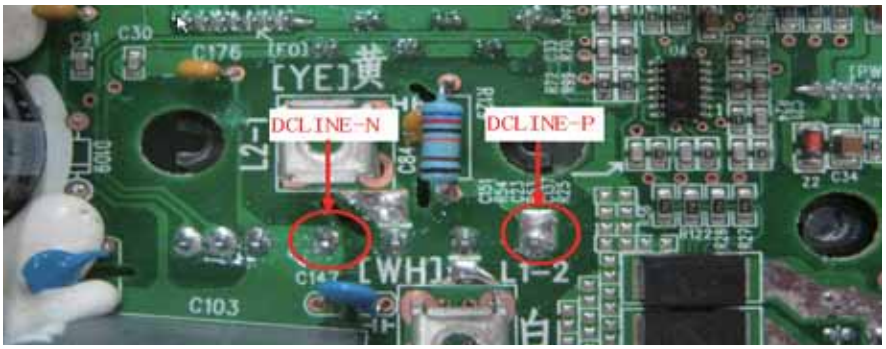


13. HC: PFC protection
Main check points:
a. Check if the unit voltage input is normal;
b. Check if the inductance wire is well connected;
c. If the above two issues are normal, please replace the ODU mainboard.

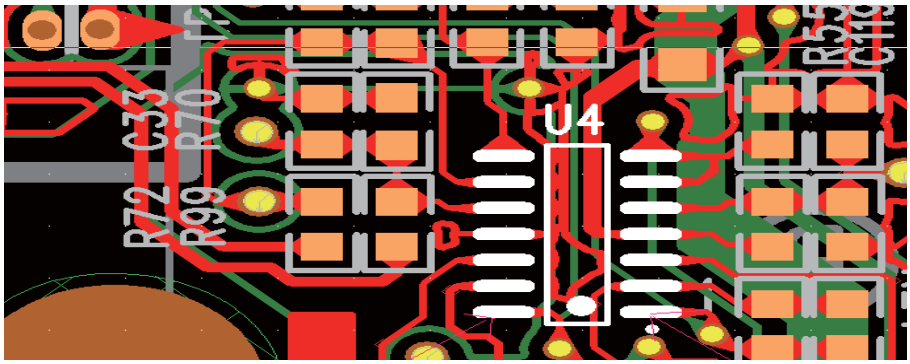


14. H7: Compressor out-of-step malfunction
Main check points:
a. Check if the system pressure is too high?
b. Check if the working voltage is too low?
15. Lc; Compressor startup failure
Main check points:
a. Check if the compressor wiring connection is well connected;
b. Check if the compressor startup interval is over 3 minutes, if not, please water for 3 minutes than turn on the unit;
c. Check if there's too much refrigerant.
d. Check if the compressor is damaged, measure the resistance between any two phase of the three phases, they should be almost the same, if they're with big difference, the compressor is damaged, please check the insulation condition of three phases to the case.
16. PU: ODU capacitor charging malfunction
Malfunction description: after the unit is energized, before the compressor starting operation, the electrolytic capacitor on mainbiard should be charging. After the charging command is received, if it is detected by chip that the voltage of electrolytic capacitor is low, it is ODU capacitor charging malfunction.
Main check points:
a. Check if the unit voltage input is within normal range.
b. Check if the electric reactor connection wiring and capacitor connection wiring is well connected, if the electric reactor is open circuit.
c. If above two issues are normal, please replace ODU mainboard.
17. P7: Module temp. sensor circuit malfunction
Malfunction description: There's a thermal resistance on top of IPM module, for detecting the module surface temperature, if it is detected by chip that the temperature is over the normal range.
Main check points:
a. The circuit on mainboard is damaged, please replace the ODU mainboard.
18. P8: Module temperature too high protection
Main check points:
a. After daubing radiating glue on IPM module, fix it with screw, if the glue is aging or the fixing screw is loosened, please daub the glue again or fix the screw and test again, if the malfunction still exist, please replace the mainboard.
19. PH: ODU DC bus bar voltage too high
Malfunction description: When it is detected the voltage of DC bus bar on electrolytic capacitor is over 400V.
Main check points:
a. Check if the input voltage is too high that out of normal power supply voltage range.

20. PL: ODU DC bus bar voltage too low
Malfunction description: When it is detected the voltage of DC bus bar on electrolytic capacitor is less than 200V.
Main check points:
a. Check if the input voltage is too low that out of normal power supply voltage range.
ODU DC bus bar voltage test point is showed as following picture, please measure the voltage of DCLINE-P and DCLINE-N with multimeter DC grade.



21. Pc: Current detection circuit malfunction/current sensor malfunction
Malfunction description: Check if IU and IV is more than 1.65V*12.5% before powering on the unit.
Main check points: Measure if the IU, IV us abnormal when power off the unit, if the voltage value is not around 1.65V, please replace the mainboard.



22. P0: IPM module reset
Malfunction description: DSP chip reset and initialize.
Main check points: Check if the wiring distribution in electric box is regular, tidy the wire and test again, if the problem still exist, please replace the mainboard.

23. Ld: Lack phase
Malfunction description: Compressor current is detected less than a certain value during operation.
Main check points: Check if the CPU mainboard is loosened or incorrect inserted. Well insert and test again, if the problem still exist, please replace the mainboard/

24. PU: Charging circuit malfunction
Malfunction description: The DC bus bar voltage is less than 100V during charging.
Main check points: Check if the circuit wiring connection is loosened or correct as wiring diagram, well connect the wire, if the malfunction still exist, please replace the mainboard.

9.3 Maintenance Method for Normal Malfunction

1. Air Conditioner Can't be Started Up

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
No power supply, or poor connection for power plug	After energization, operation indicator isn't bright and the buzzer can't give out sound	Confirm whether it's due to power failure. If yes, wait for power recovery. If not, check power supply circuit and make sure the power plug is connected well.
Wrong wire connection between indoor unit and outdoor unit, or poor connection for wiring terminals	Under normal power supply circumstances, operation indicator isn't bright after energization	Check the circuit according to circuit diagram and connect wires correctly. Make sure all wiring terminals are connected firmly
Electric leakage for air conditioner	After energization, room circuit breaker trips off at once	Make sure the air conditioner is grounded reliably Make sure wires of air conditioner is connected correctly Check the wiring inside air conditioner. Check whether the insulation layer of power cord is damaged; if yes, place the power cord.
Model selection for air switch is improper	After energization, air switch trips off	Select proper air switch
Malfunction of remote controller	After energization, operation indicator is bright, while no display on remote controller or buttons have no action.	Replace batteries for remote controller Repair or replace remote controller

2. Poor Cooling (Heating) for Air Conditioner

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
Set temperature is improper	Observe the set temperature on remote controller	Adjust the set temperature
Rotation speed of the IDU fan motor is set too low	Small wind blow	Set the fan speed at high or medium
Filter of indoor unit is blocked	Check the filter to see it's blocked	Clean the filter
Installation position for indoor unit and outdoor unit is improper	Check whether the installation postion is proper according to installation requirement for air conditioner	Adjust the installation position, and install the rainproof and sunproof for outdoor unit
Refrigerant is leaking	Discharged air temperature during cooling is higher than normal discharged wind temperature; Discharged air temperature during heating is lower than normal discharged wind temperature; Unit's pressure is much lower than regulated range	Find out the leakage causes and deal with it. Add refrigerant.
Malfunction of 4-way valve	Blow cold wind during heating	Replace the 4-way valve
Malfunction of capillary	Discharged air temperature during cooling is higher than normal discharged wind temperature; Discharged air temperature during heating is lower than normal discharged wind temperature; Unit't pressure is much lower than regulated range. If refrigerant isn't leaking, part of capillary is blocked	Replace the capillary
Flow volume of valve is insufficient	The pressure of valves is much lower than that stated in the specification	Open the valve completely
Malfunction of horizontal louver	Horizontal louver can't swing	Refer to point 3 of maintenance method for details
Malfunction of the IDU fan motor	The IDU fan motor can't operate	Refer to troubleshooting for H6 for maintenance method in details
Malfunction of the ODU fan motor	The ODU fan motor can't operate	Refer to point 4 of maintenance method for details
Malfunction of compressor	Compressor can't operate	Refer to point 5 of maintenance method for details

3. Horizontal Louver Can't Swing

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
Wrong wire connection, or poor connection	Check the wiring status according to circuit diagram	Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly
Stepping motor is damaged	Stepping motor can't operate	Repair or replace stepping motor
Main board is damaged	Others are all normal, while horizontal louver can't operate	Replace the main board with the same model

4. ODU Fan Motor Can't Operate

Possible causes	Discriminating method (air conditioner status)	Troubleshooting
Wrong wire connection, or poor connection	Check the wiring status according to circuit diagram	Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly
Capacity of the ODU fan motor is damaged	Measure the capacity of fan capacitor with an universal meter and find that the capacity is out of the deviation range indicated on the nameplate of fan capacitor.	Replace the capacity of fan
Power voltage is a little low or high	Use universal meter to measure the power supply voltage. The voltage is a little high or low	Suggest to equip with voltage regulator
Motor of outdoor unit is damaged	When unit is on, cooling/heating performance is bad and ODU compressor generates a lot of noise and heat.	Change compressor oil and refrigerant. If no better, replace the compressor with a new one

5. Compressor Can't Operate

Possible causes	Discriminating method (air conditioner status)	Troubleshooting
Wrong wire connection, or poor connection	Check the wiring status according to circuit diagram	Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly
Capacity of compressor is damaged	Measure the capacity of fan capacitor with an universal meter and find that the capacity is out of the deviation range indicated on the nameplate of fan capacitor.	Replace the compressor capacitor
Power voltage is a little low or high	Use universal meter to measure the power supply voltage. The voltage is a little high or low	Suggest to equip with voltage regulator
Coil of compressor is burnt out	Use universal meter to measure the resistance between compressor terminals and it's 0	Repair or replace compressor
Cylinder of compressor is blocked	Compressor can't operate	Repair or replace compressor

6. Air Conditioner is Leaking

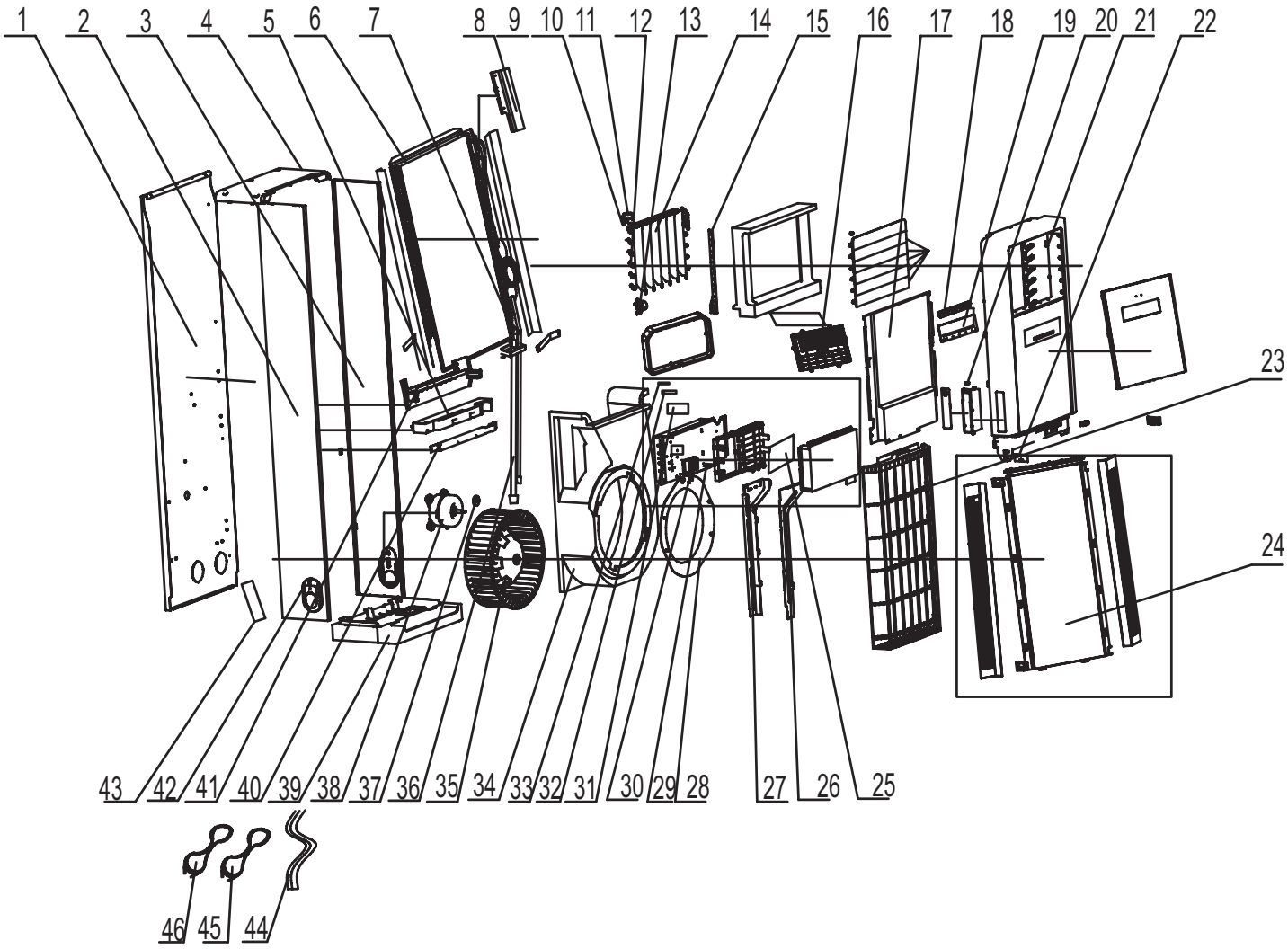
Possible causes	Discriminating method (air conditioner status)	Troubleshooting
Drain pipe is blocked	Water leaking from indoor unit	Eliminate the foreign objects inside the drain pipe
Drain pipe is broken	Water leaking from drain pipe	Replace drain pipe
Wrapping is not tight	Water leaking from the pipe connection place of indoor unit	Wrap it again and bundle it tightly

7. Abnormal Sound and Vibration

Possible causes	Discriminating method (air conditioner status)	Troubleshooting
When turn on or turn off the unit, the panel and other parts will expand and there's abnormal sound	There's the sound of "PAPA"	Normal phenomenon. Abnormal sound will disappear after a few minutes.
When turn on or turn off the unit, there's abnormal sound due to flow of refrigerant inside air conditioner	Water-running sound can be heard	Normal phenomenon. Abnormal sound will disappear after a few minutes.
Foreign objects inside the indoor unit or there're parts touching together inside the indoor unit	There's abnormal sound fro indoor unit	Remove foreign objects. Adjust all parts' position of indoor unit, tighten screws and stick damping plaster between connected parts
Foreign objects inside the outdoor unit or there're parts touching together inside the outdoor unit	There's abnormal sound fro outdoor unit	Remove foreign objects. Adjust all parts' position of outdoor unit, tighten screws and stick damping plaster between connected parts
Short circuit inside the magnetic coil	During heating, the way valve has abnormal electromagnetic sound	Replace magnetic coil
Abnormal shake of compressor	Outdoor unit gives out abnormal sound	Adjust the support foot mat of compressor, tighten the bolts
Abnormal sound inside the compressor	Abnormal sound inside the compressor	If add too much refrigerant during maintenance, please reduce refrigerant properly. Replace compressor for other circumstances.

10. Exploded View and Parts List

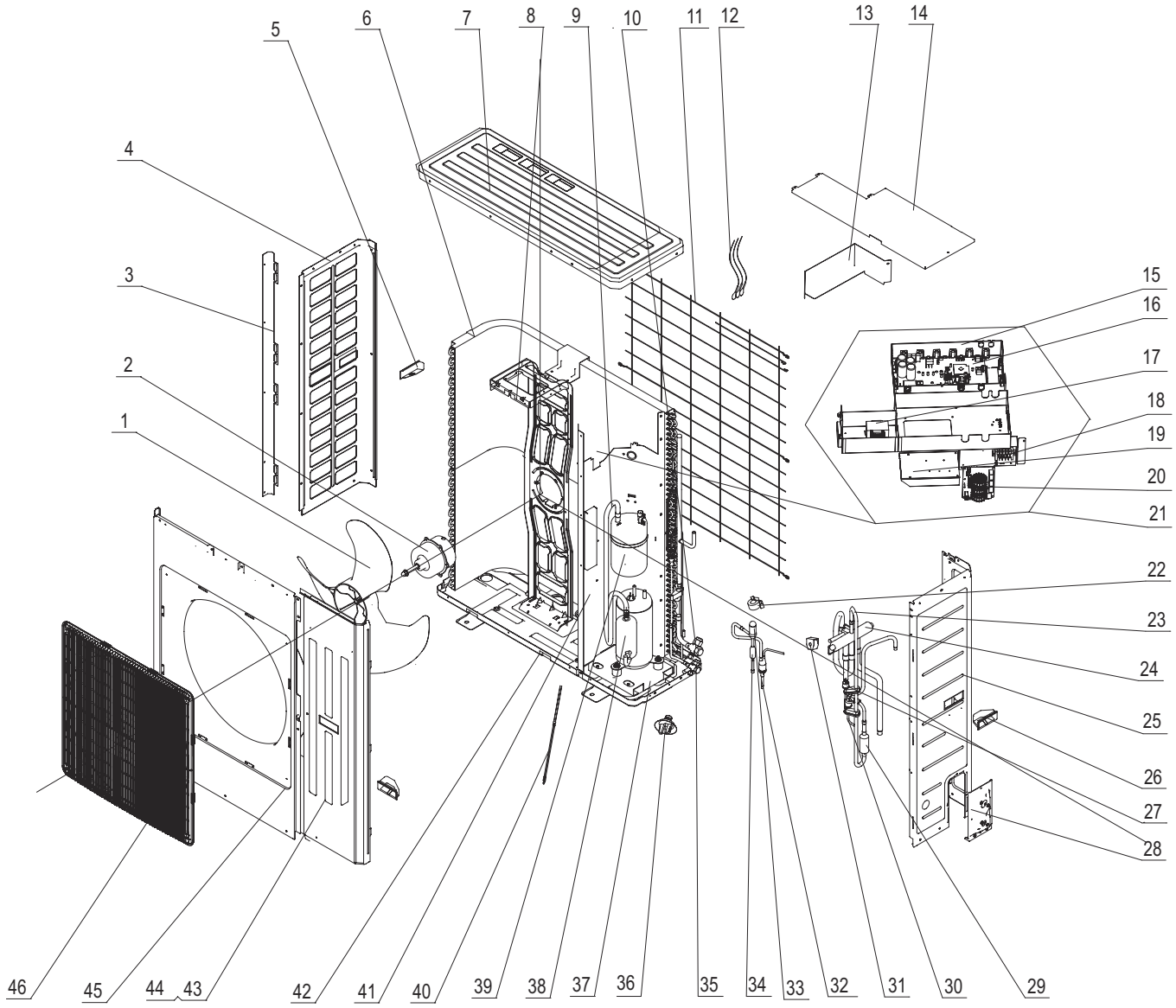
10.1 Indoor Unit



NO.	Description	Part Code	Qty
		GVH48AH-M3DNA5A/I	
	Product Code	CH090N00500	
1	Rear Plate Sub-Assy	01304500	1
2	Left Side Plate Sub-Assy	0130451901	1
3	Right Side Plate Sub-Assy	0130451801	1
4	Top Cover Sub-Assy	22244152	1
5	Water Tray Sub-Assy	12314811	1
6	Evaporator Assy	01004573	1
7	Temperature Sensor	390001376	1
8	Protection Cover	20124062	1
9	Crank 1	10564204	1
10	Crankshaft of Guide Louver	1056420502	6
11	Stepping Motor	1521400803	1
12	Crankshaft of Guide Louver	/	/
13	Stepping Motor	1521400803	1
14	Air Louver	10514104	6
15	Guide Blade Lever	10584089	1
16	Electric Controller Box Sub-Assy	20104198	1
17	Air Guard Assy	01364509	1
18	Button	45034088D	1
19	Display Board	30568270	1
20	Latch	70810302	1
21	Air Outlet Panel Assy	00003900025	1
22	Screw Cover	24254018	2
23	Filter Sub-Assy	07210028	1
24	Air Intake Panel Assy	20004536	1
25	Main Board	30138000684	1
26	Electric Box Cover	0141405901	1
27	Electric Box Cover Sub-Assy	01404388	1
28	Diversion Circle	10374435	1
29	Electric Box Assy	10000201620	1
30	Terminal Board	420111041	1
31	Radiator	49010252	1
32	Transformer	43110287	1
33	Fuse	46010060	1
34	Propeller Housing Sub-assy	12104058	1
35	Centrifugal Fan	10314401	1
36	Drainage Pipe Sub-assy	05235434	1
37	Gasket	70414201	1
38	Fan Motor	1501442502	1
39	Chassis	22224020	1
40	Breakwater	01364262	1
41	Baffle Plate	2611408801	3
42	Rear Cover	2224422101	3
43	Drain Pipe	05230022	1
44	Connecting Cable	4002053910	1
45	Connecting Cable	4002052319	1

Above data is subject to change without notice.

10.2 Outdoor Unit



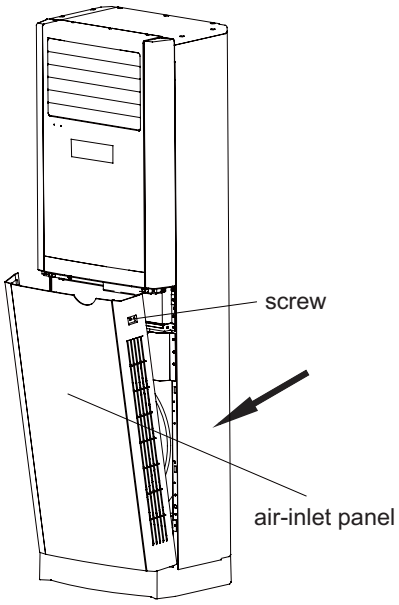
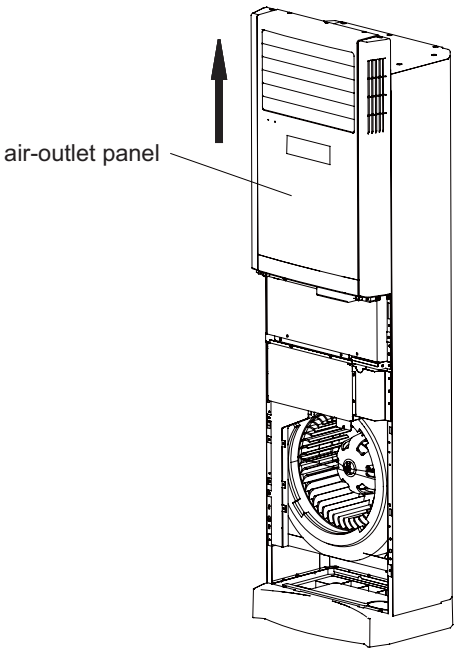
NO.	Description	Part Code	Qty
		GVH48AH-M3DNA5A/O	
	Product Code	CH090W00500	
1	Axial Flow Fan	10335010	1
2	Fan Motor	1570280201	1
3	Condenser Support Plate	01795020	1
4	Left Side Plate	01305064P	1
5	Left Handle	26235401	1
6	Condenser Assy	01105732	1
7	Top Cover	0125500901P	1
8	Motor Support Assy	01805734	1
9	Inhalation Tube1	04655520	1
10	Cut off Valve	07133157	1
11	Rear Grill	01475012	1
12	Temperature Sensor	3900030904	1
13	Air Guard	01355204	1
14	Electric Box Cover	01265398	1
15	Electric Box	26905211	1
16	Main Board	30228000042	1
17	Reactor	43130178	1
18	Terminal Board	42010052	1
19	Radiator	49010252	4
20	Filter Board	30228123	1
21	Electric Box Assy	10000100265	1
22	Solenoid of Electronic Expansion Valve	4300010812	1
23	4-way Valve Assy	03025806	1
24	4-way Valve	43000338	1
25	Right Side Plate Sub-Assy	0130508901P	1
26	Handle	26235253	2
27	Pressure Protect Switch	46020006	1
28	Valve Support Sub-Assy	01715257P	1
29	Strainer	07215201	1
30	Pressure Protect Switch	46020006	1
31	Magnet Coil	4300040029	1
32	Electric Expansion Valve Sub-Assy	07135439	1
33	Electronic Expansion Valve	07334194	1
34	Strainer	0741410000601	1
35	Cut-off Valve	071302391	1
36	Drainage Connecter	26113009	1
37	Retaining Plate Sub-Assy	01845235P	1
38	Compressor and Fittings	00200008	1
39	Gas-liquid Separator Sub-Assy	07255201	1
40	Eectrical Heater	7651873224	1
41	Clapboard Sub-Assy	01245261	2
42	Chassis Sub-assy	01195315P	1
43	Front Side Plate Sub-Assy	01305508	1
44	Front Side Plate	01305065P	1
45	Cabinet	01435007P	1
46	Front Grill	22415005	1

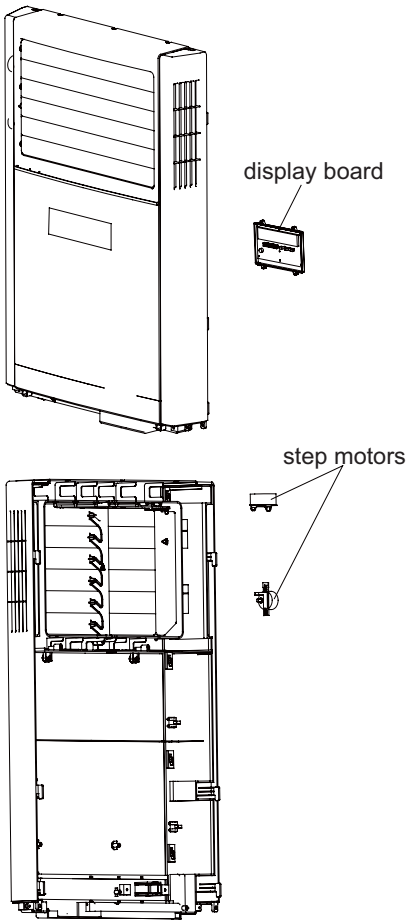
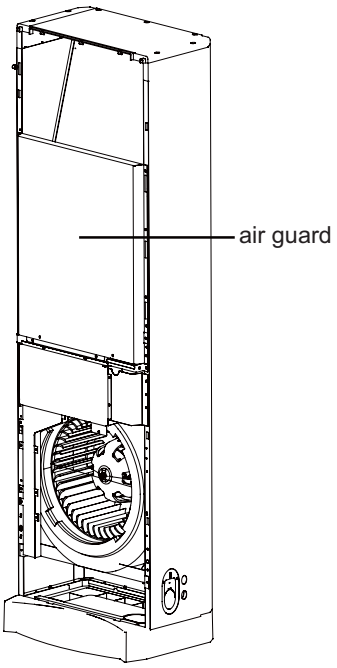
Above data is subject to change without notice.

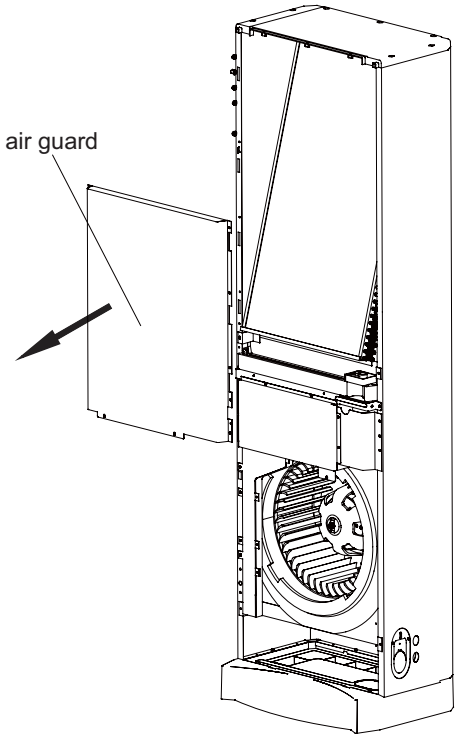
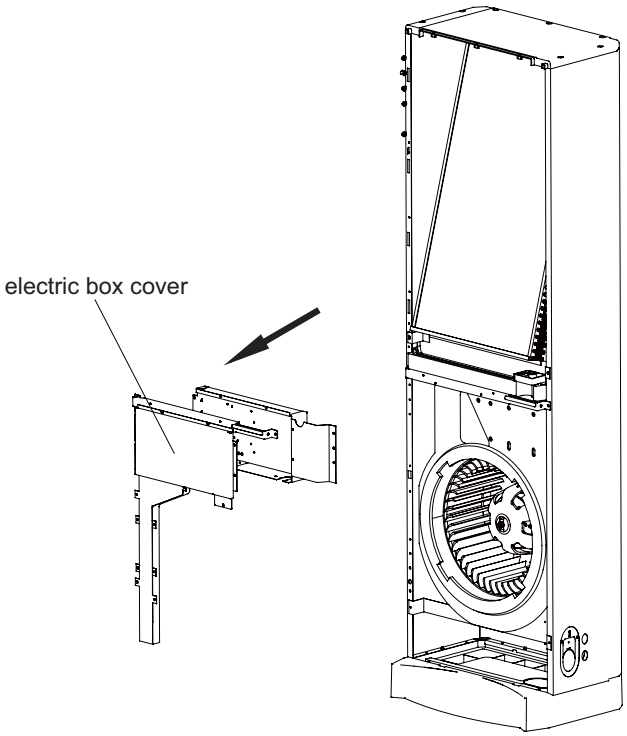
11. Removal Procedure

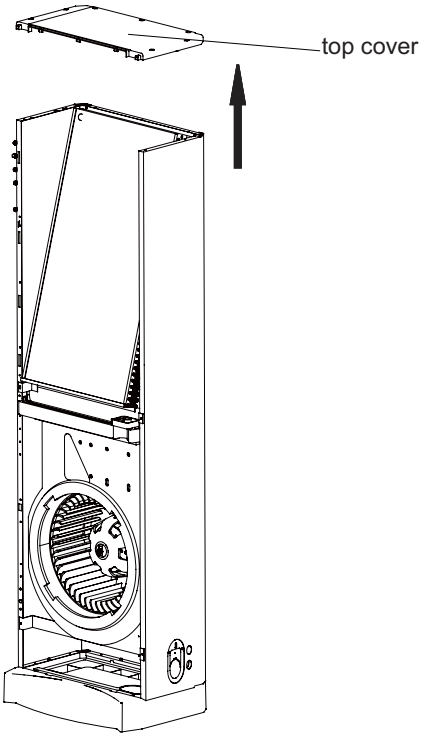
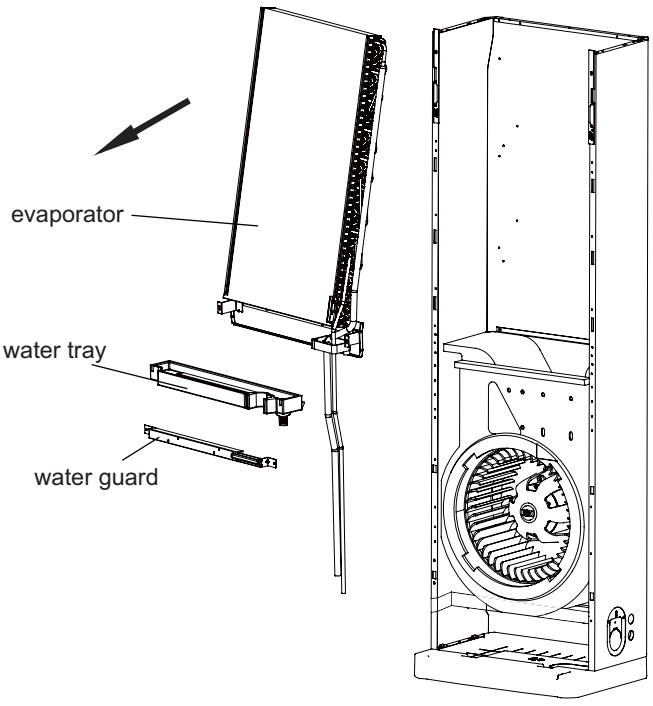
⚠ **Caution: discharge the refrigerant completely before removal.**

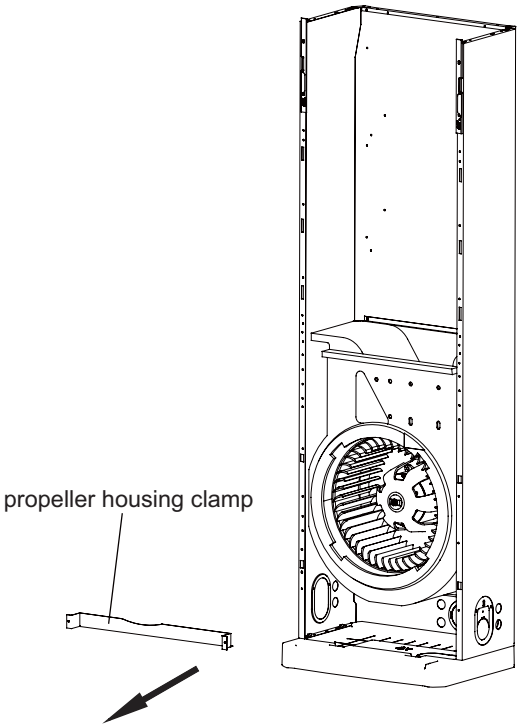
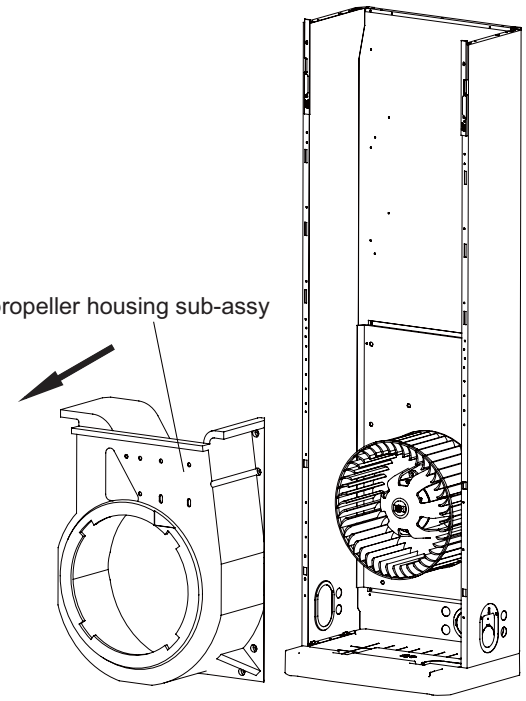
11.1 Removal Procedure of Indoor Unit

Steps	Procedure	
1. Remove air-inlet panel		
	Remove the screw stopper; remove the screws fixing air-inlet panel and pull the upper part of air-inlet panel outwards.	
2. Remove air-outlet panel		
	Remove the screws fixing the top and lower part of air-outlet panel; push the air-outlet panel upwards slightly and then remove the air-outlet panel.	

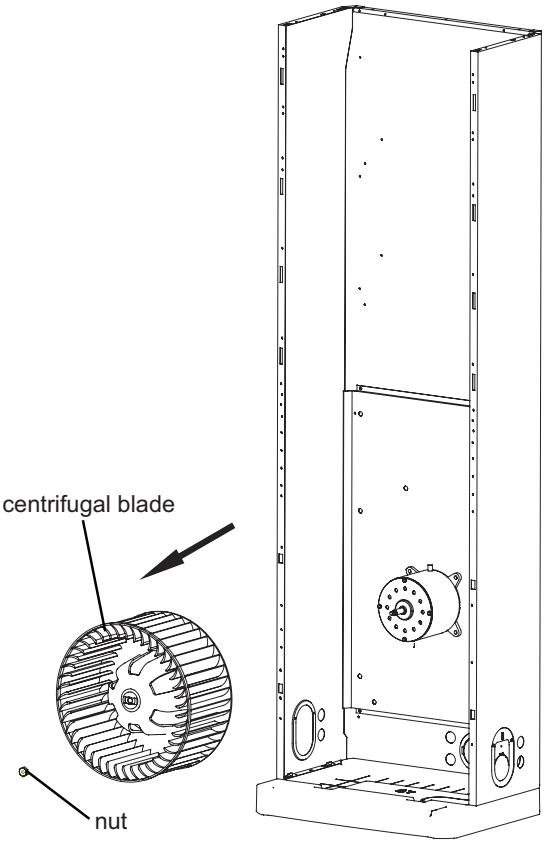
Steps	Procedure
3. Remove display board, horizontal swing motor and vertical swing motor Remove the screws fixing controller box; remove the controller box cover to remove the display board; remove the screw fixing motor in the air-outlet panel sub-assy; remove the horizontal swing motor and vertical swing motor.	
4. Remove air guard Remove the screw fixing air guard and then remove the air guard.	

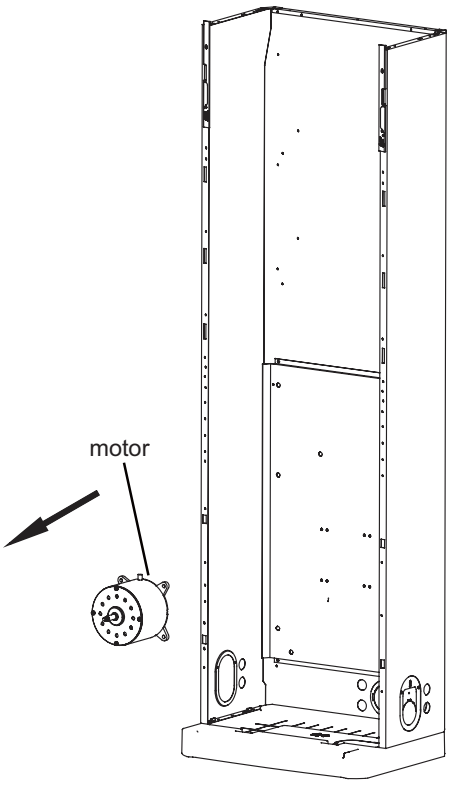
Steps	Procedure	
		
5. Remove electric box assy		
	Remove the screw fixing electric box cover to remove the electric box cover; disconnect each wiring terminal; remove the relevant electrical elements according to the requirement; remove the screw fixing electric box to remove the electric box assy.	

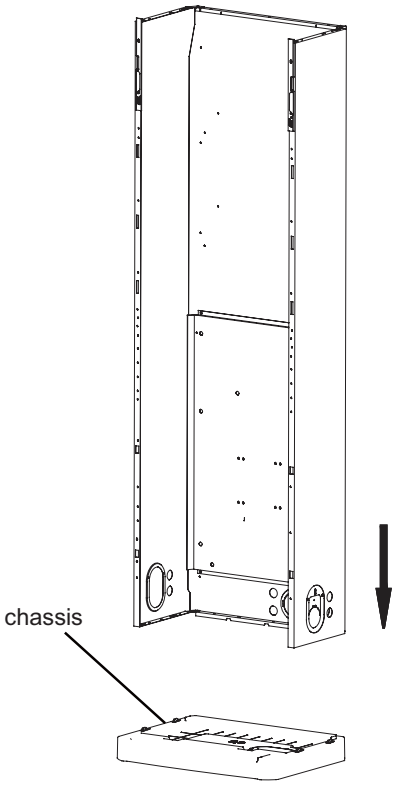
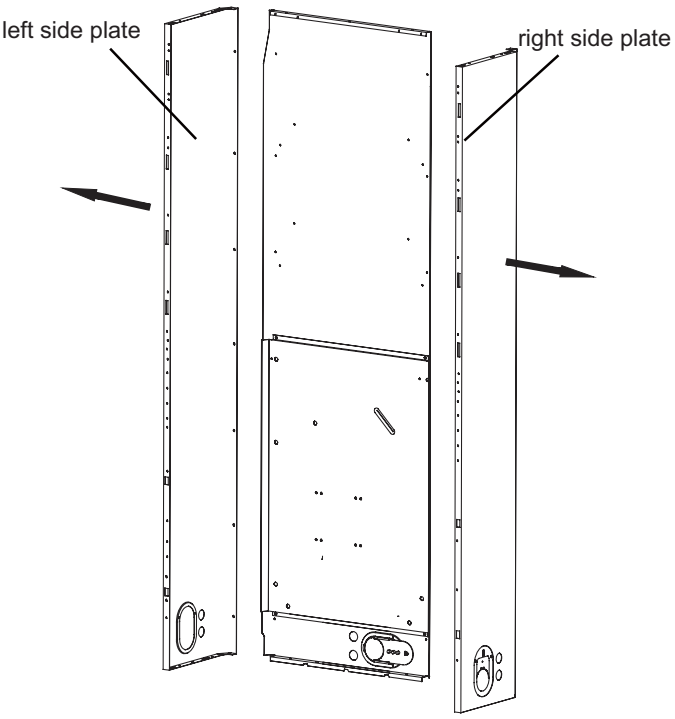
Steps	Procedure	
6. Remove top cover		
	Remove the screw fixing top cover to remove the top cover.	
7. Remove evaporator assy		
	Remove the screws fixing the top connection plate and lower connection plate of evaporator; pull the left side plate and right side plate outwards slightly to remove the evaporator, water guard and water tray; after removing the evaporator, remove the left and right air guard and water guard at the top side of evaporator.	

Steps	Procedure
8. Remove propeller housing clamp	
	Remove the screws fixing propeller housing clamp and then pull the propeller housing clamp outwards to remove the propeller housing clamp.
	
9. Remove propeller housing sub-assy	
	Remove the screws fixing propeller housing to remove the propeller housing sub-assy.
	

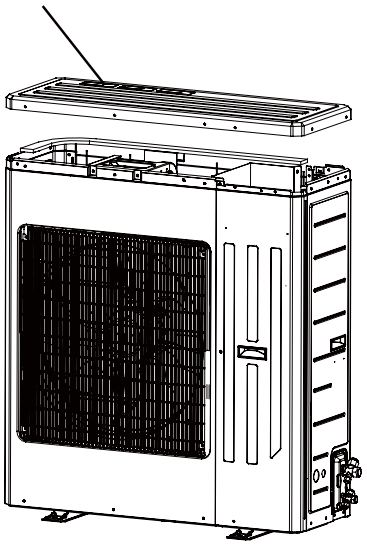
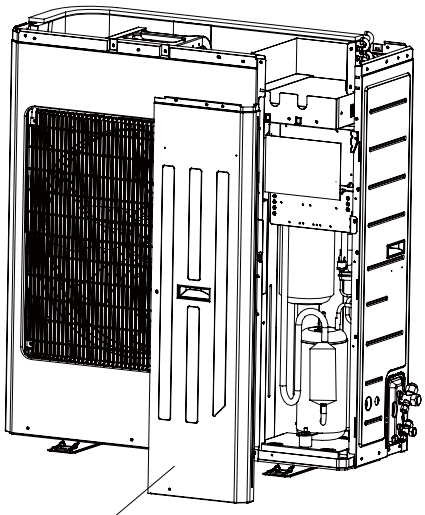
Steps	Procedure
10. Remove centrifugal blade	
	Remove the nut fixing centrifugal blade to remove the centrifugal blade.
11. Remove motor	
	Remove the remove the wire clamp on the rear plate; disconnect the motor wire and remove the screws fixing motor to remove the motor.

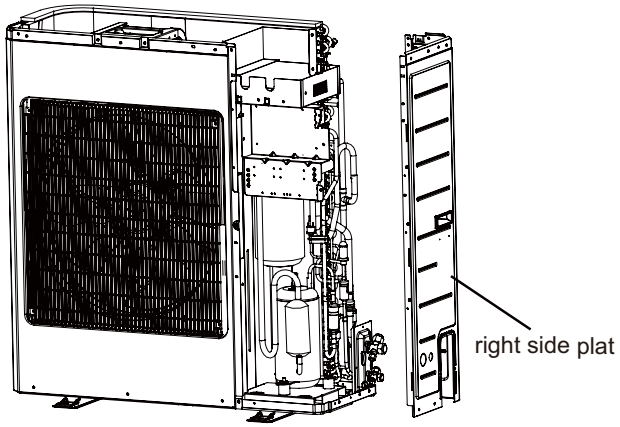
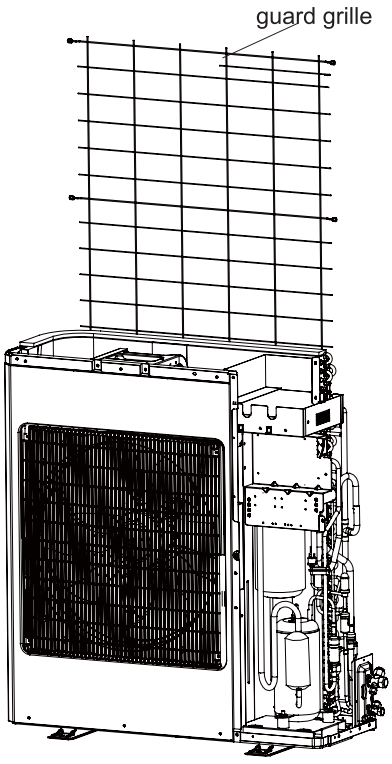


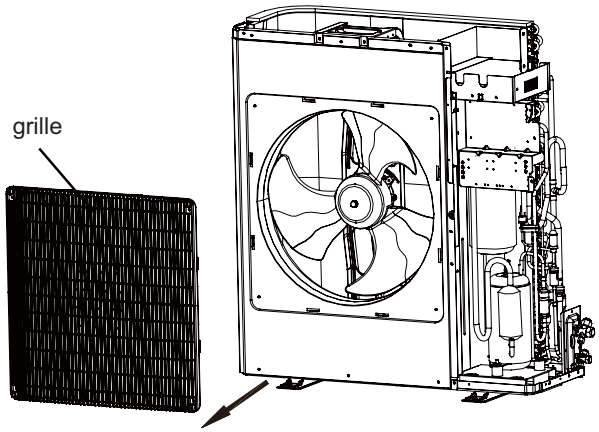
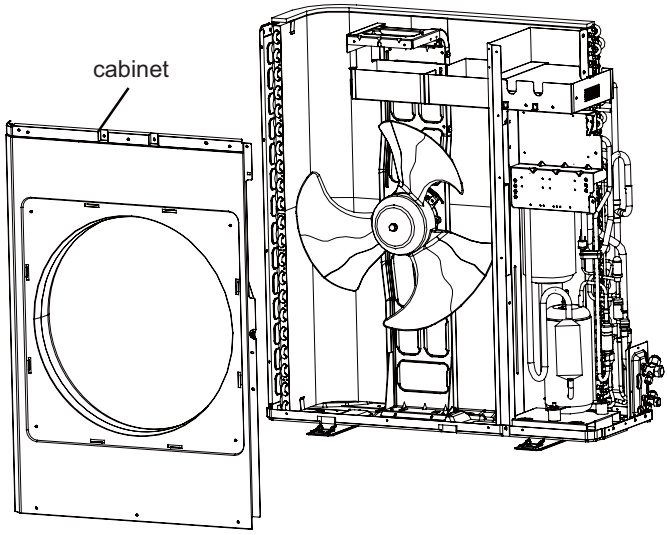
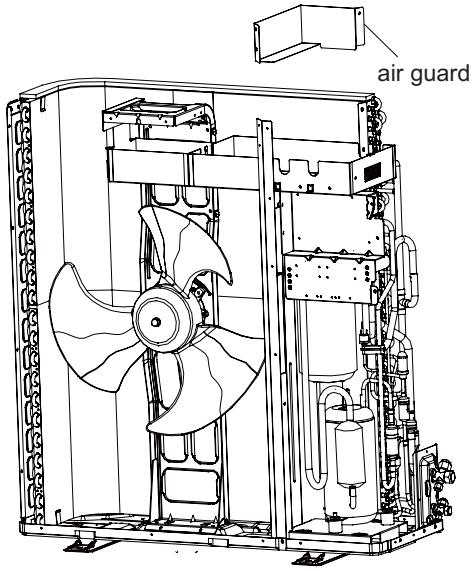


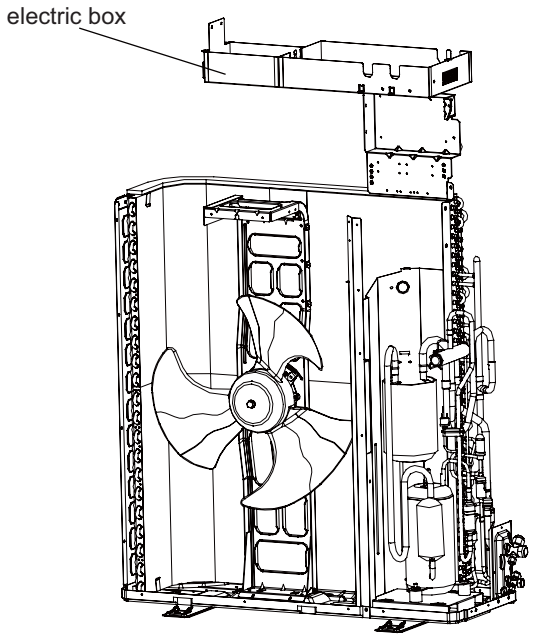
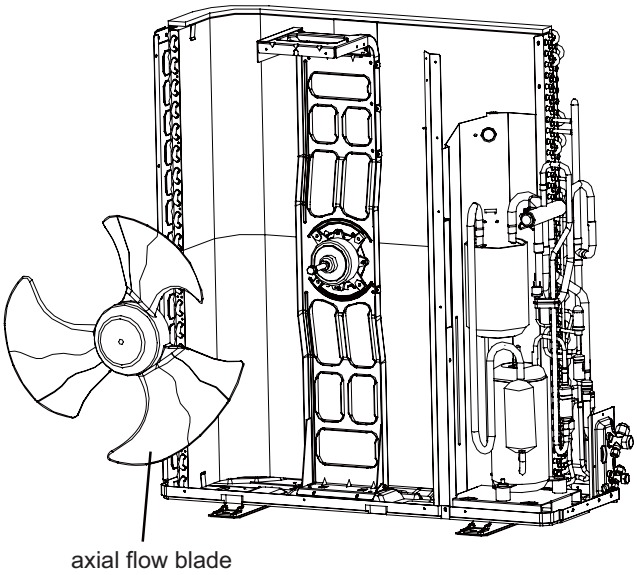
Steps	Procedure
12. Remove chassis	
	Remove the screws fixing chassis to remove the chassis.
	
13. Remove left side plate and right side plate	
	Remove the screws fixing left side plate and right side plate to remove the left side plate and right side plate sub-assy.
	

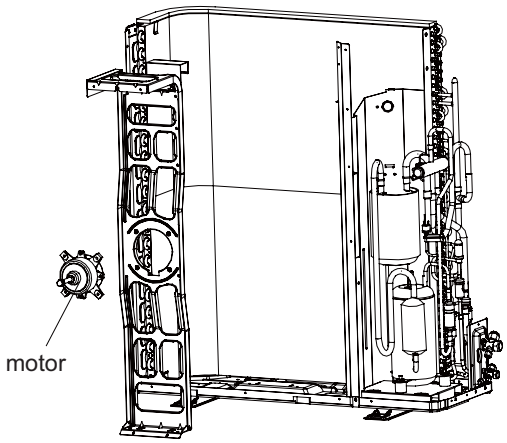
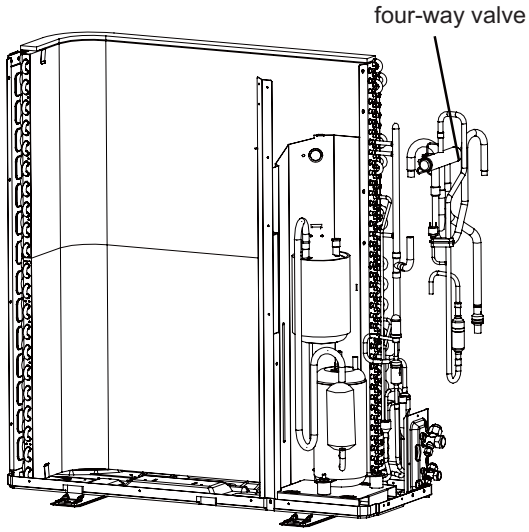
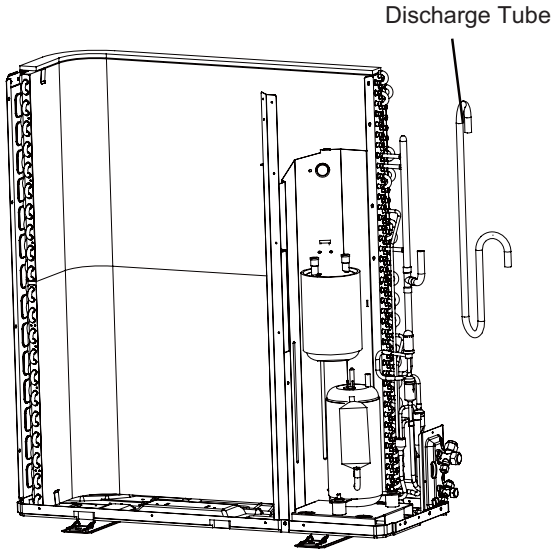
11.2 Removal Procedure of Outdoor Unit

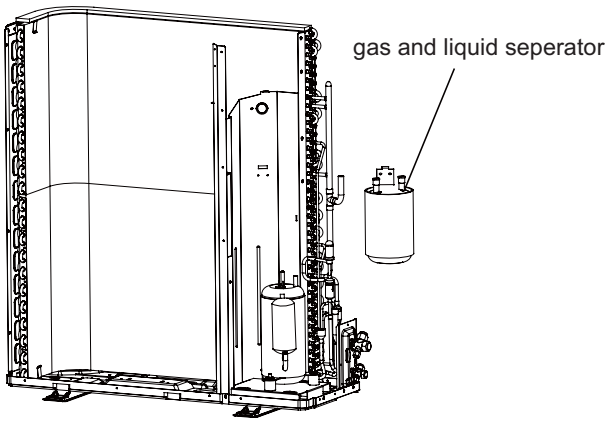
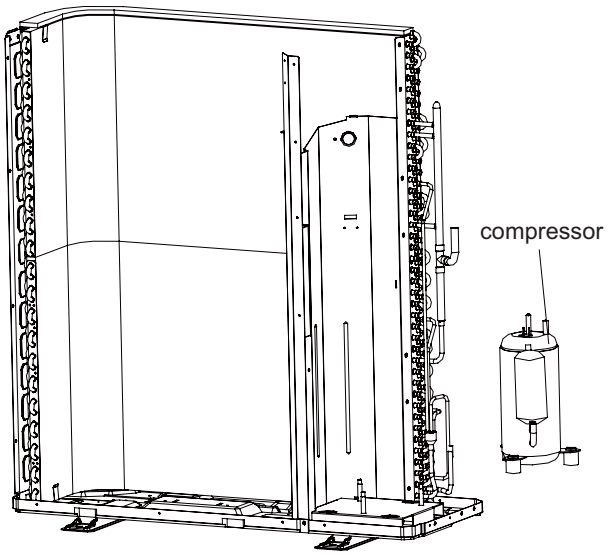
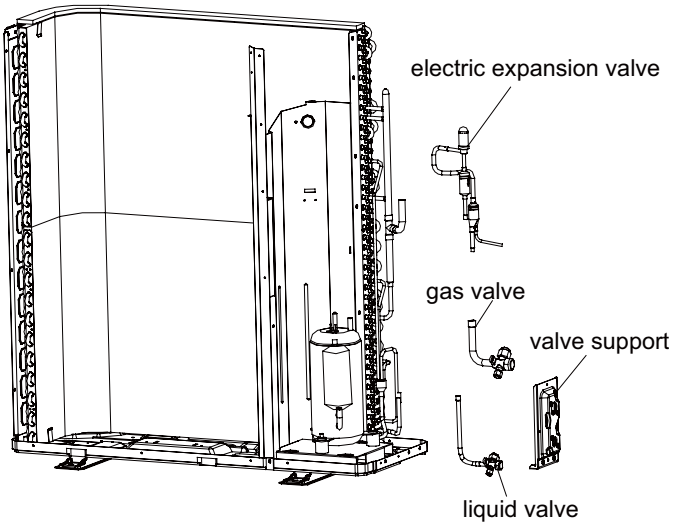
Steps	Procedure
1.Remove top panel	top panel 
Twist off the screws used for fixing the top cover with screwdriver, lift up the top cover and then remove the top cover.	
2.Remove front side plate	front side plate 
Twist off the screws used for fixing the front side plate, pull the front side plate forward and outward and then remove the front side plate.	

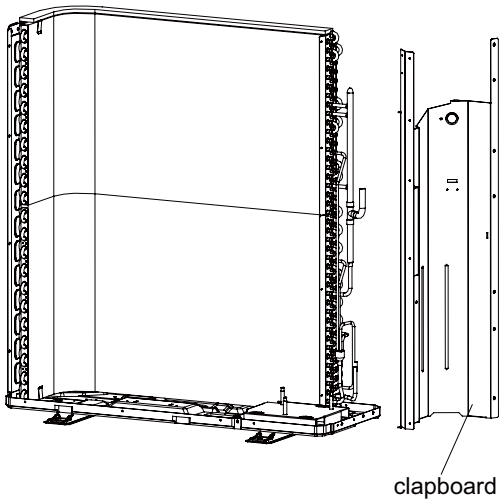
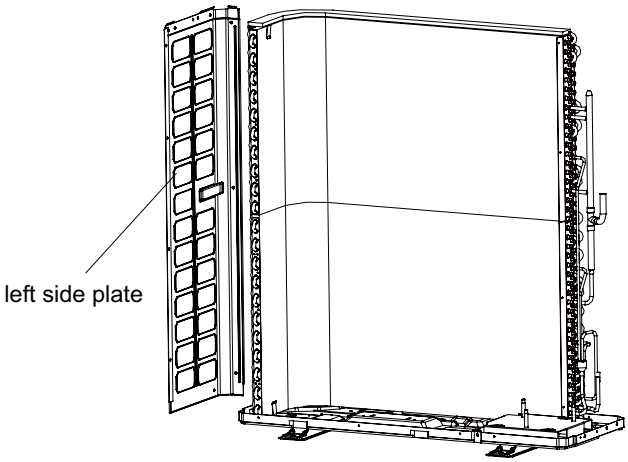
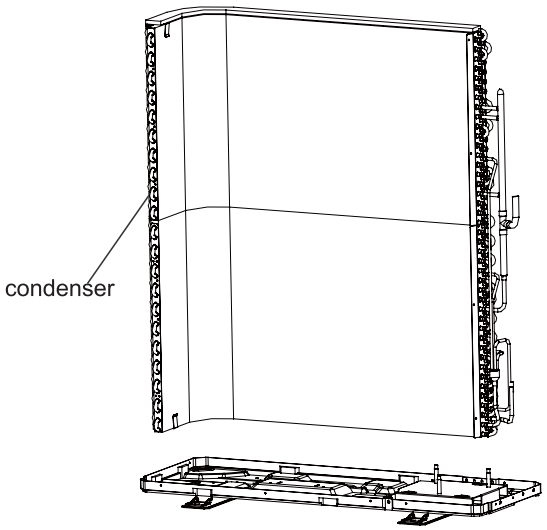
Step	Procedure
3.Remove right side plate Twist off the screw used for fixing the right side plate and then pull the right side plate outward.	
4. Remove guard grille Remove 6 screws fixing the guard grille, and then remove the guard grille.	

Steps	Procedure
5.Remove grille	
Twist off the screw used for fixing the grille, loosen the clasp, pull out the grille outward and then remove the grille.	
6.Remove cabinet	
Twist off the screw used for fixing the outer case, pull the cabinet outwardand then remove the cabinet.	
7.Remove air guard	
Remove 4 screws fixing the air guard and then disassemble the air guard.	

Steps	Procedure
8.Remove electric box	
Cut off the tieline, pull out the wiring terminal, remove all the connecting wires, twist off the screws used for fixing the electric box, pull it upward and then remove the electric box.	
9.Remove axial flow blade	
Twist off the nuts used for fixing the axial flow blade, pull the axial flowblade outwardand then remove the blade.	

Steps	Procedure
10.Remove motor	
Twist off the screws used for fixing the motor, pull out the motor wire and pull it outward,then remove the motor.	
11.Remove four-way valve and air intake pipe	
Release the refrigerant completely, unsolder the air intake pipe of compressor, outlet pipe of condenser, connecting pipe of gas valve and gas and liquid separator, then pull the four-way valve and air intake pipe.	
12.Remove Discharge Tube	
Discharge the refrigerant completely unsolder the pipelines connecting the compressor and the condenser assy.and then remove the discharge tube. (NOTE: Before unsoldering,please discharge the refrigerant completely.When unsoldering the soldering joint, wrap the gas valve with wet cloth completely to avoid damage to the valve caused by high temperature.	

Steps	Procedure
13.Remove gas and liquid separator	
Loosen the two screws used for fixing the gas and liquid separator, pull it upward and then remove the gas and liquid separator.	
14.Remove compressor	
Twist off the nuts used for fixing the compressor withwrench, pull the compressor upward to remove it.	
15.Remove valve support 、electric expansion valve、gas valve and liquid valve	
Unsolder the spot weld connecting capillary and connecting pipe of liquid valve,remove 2 bolts fixing the valve support with wrench.Remove 4 bolts connecting gas and liquid valves,and valve support and then remove the gas and liquid vales. Twist off the screws used for fixing the , unsolder the spot weld between electric expansion valve (notice: before soldering, the refrigerant should be released completely), pull it outward and then remove the electric expansion valve.	

Step	Procedure
16.Remove clapboard Remove 5 screws connecting clapboard,end plate of condenser and chassis,and then remove clapboard.	
17.Remove left side plate Twist off the screws connecting the left side plate and chassis withscrewdriver, and then remove the left side plate.	
18.Remove condenser Remove 2 screws fixing end plates of condenser and chassis, and lift the condenser upwards to remove it.	

Appendix:

Appendix 1: Reference Sheet of Celsius and Fahrenheit

Conversion formula for Fahrenheit degree and Celsius degree: Tf=Tcx1.8+32

Set temperature

Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)	Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)	Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)
61	60.8	16	69/70	69.8	21	78/79	78.8	26
62/63	62.6	17	71/72	71.6	22	80/81	80.6	27
64/65	64.4	18	73/74	73.4	23	82/83	82.4	28
66/67	66.2	19	75/76	75.2	24	84/85	84.2	29
68	68	20	77	77	25	86	86	30

Ambient temperature

Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)	Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)	Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)
32/33	32	0	55/56	55.4	13	79/80	78.8	26
34/35	33.8	1	57/58	57.2	14	81	80.6	27
36	35.6	2	59/60	59	15	82/83	82.4	28
37/38	37.4	3	61/62	60.8	16	84/85	84.2	29
39/40	39.2	4	63	62.6	17	86/87	86	30
41/42	41	5	64/65	64.4	18	88/89	87.8	31
43/44	42.8	6	66/67	66.2	19	90	89.6	32
45	44.6	7	68/69	68	20	91/92	91.4	33
46/47	46.4	8	70/71	69.8	21	93/94	93.2	34
48/49	48.2	9	72	71.6	22	95/96	95	35
50/51	50	10	73/74	73.4	23	97/98	96.8	36
52/53	51.8	11	75/76	75.2	24	99	98.6	37
54	53.6	12	77/78	77	25			

Appendix 2: Configuration of Connection Pipe

1.Standard length of connection pipe
● 5m, 7.5m, 8m.
2.Min. length of connection pipe is 3m.
3.Max. length of connection pipe and max. high difference.

Cooling capacity	Max length of connection pipe	Max height difference
5000 Btu/h(1465 W)	15 m	5 m
7000 Btu/h(2051 W)	15 m	5 m
9000 Btu/h(2637 W)	15 m	10 m
12000 Btu/h(3516 W)	20 m	10 m
18000 Btu/h(5274 W)	25 m	10 m
24000 Btu/h(7032 W)	25 m	10 m
28000 Btu/h(8204 W)	30 m	10 m
36000 Btu/h(10548 W)	30 m	20 m
42000 Btu/h(12306 W)	30 m	20 m
48000 Btu/h(14064 W)	30 m	20 m

4.The additional refrigerant oil and refrigerant charging required after prolonging connection pipe
● After the length of connection pipe is prolonged for 10m at the basis of standard length, you should add 5ml of refrigerant oil for each additional 5m of connection pipe.
● The calculation method of additional refrigerant charging amount (on the basis of liquid pipe):

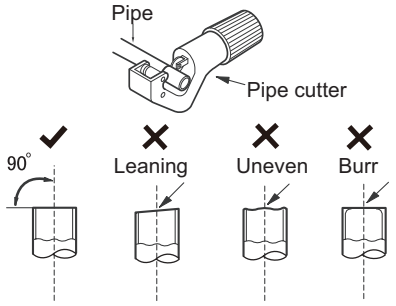
● When the length of connection pipe is above 5m, add refrigerant according to the prolonged length of liquid pipe. The additional refrigerant charging amount per meter is different according to the diameter of liquid pipe. See the following sheet.
● Additional refrigerant charging amount = prolonged length of liquid pipe X additional refrigerant charging amount per meter

Additional refrigerant charging amount for R22, R407C, R410A and R134a			
Diameter of connection pipe		Outdoor unit throttle	
Liquid pipe(mm)	Gas pipe(mm)	Cooling only(g/m)	Cooling and heating(g/m)
Φ6	Φ9.5 or Φ12	15	20
Φ6 or Φ9.5	Φ16 or Φ19	15	20
Φ12	Φ19 or Φ22.2	30	120
Φ16	Φ25.4 or Φ31.8	60	120
Φ19	/	250	250
Φ22.2	/	350	350

Appendix 3: Pipe Expanding Method

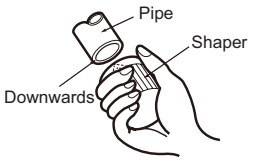
⚠ **Note:**

Improper pipe expanding is the main cause of refrigerant leakage.Please expand the pipe according to the following steps:



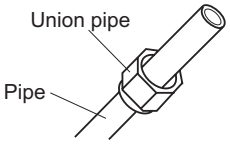
A:Cut the pip
- Confirm the pipe length according to the distance of indoor unit and outdoor unit.
- Cut the required pipe with pipe cutter.

B:Remove the burrs
- Remove the burrs with shaper and prevent the burrs from getting into the pipe.



C:Put on suitable insulating pipe

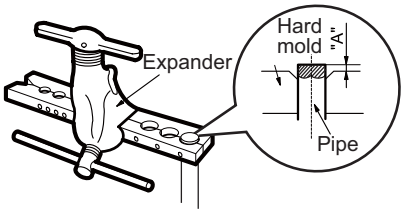
D:Put on the union nut
- Remove the union nut on the indoor connection pipe and outdoor valve; install the union nut on the pipe.



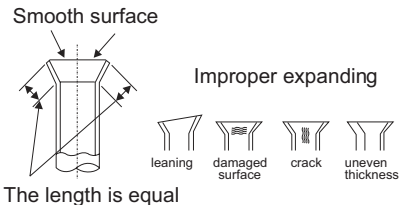
E:Expand the port
- Expand the port with expander.

⚠ **Note:**
- "A" is different according to the diameter, please refer to the sheet below:

Outer diameter(mm)	A(mm)	
	Max	Min
Φ6 - 6.35 (1/4")	1.3	0.7
Φ9.52 (3/8”)	1.6	1.0
Φ12 - 12.70 (1/2”)	1.8	1.0
Φ16 - 15.88 (5/8”)	2.4	2.2



F:Inspection
- Check the quality of expanding port. If there is any blemish, expand the port again according to the steps above.



Appendix 4: List of Resistance for Temperature Sensor

Resistance Table of Ambient Temperature Sensor for Indoor and Outdoor Units(15K)

Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)
-19	138.1	20	18.75	59	3.848	98	1.071
-18	128.6	21	17.93	60	3.711	99	1.039
-17	121.6	22	17.14	61	3.579	100	1.009
-16	115	23	16.39	62	3.454	101	0.98
-15	108.7	24	15.68	63	3.333	102	0.952
-14	102.9	25	15	64	3.217	103	0.925
-13	97.4	26	14.36	65	3.105	104	0.898
-12	92.22	27	13.74	66	2.998	105	0.873
-11	87.35	28	13.16	67	2.896	106	0.848
-10	82.75	29	12.6	68	2.797	107	0.825
-9	78.43	30	12.07	69	2.702	108	0.802
-8	74.35	31	11.57	70	2.611	109	0.779
-7	70.5	32	11.09	71	2.523	110	0.758
-6	66.88	33	10.63	72	2.439	111	0.737
-5	63.46	34	10.2	73	2.358	112	0.717
-4	60.23	35	9.779	74	2.28	113	0.697
-3	57.18	36	9.382	75	2.206	114	0.678
-2	54.31	37	9.003	76	2.133	115	0.66
-1	51.59	38	8.642	77	2.064	116	0.642
0	49.02	39	8.297	78	1.997	117	0.625
1	46.6	40	7.967	79	1.933	118	0.608
2	44.31	41	7.653	80	1.871	119	0.592
3	42.14	42	7.352	81	1.811	120	0.577
4	40.09	43	7.065	82	1.754	121	0.561
5	38.15	44	6.791	83	1.699	122	0.547
6	36.32	45	6.529	84	1.645	123	0.532
7	34.58	46	6.278	85	1.594	124	0.519
8	32.94	47	6.038	86	1.544	125	0.505
9	31.38	48	5.809	87	1.497	126	0.492
10	29.9	49	5.589	88	1.451	127	0.48
11	28.51	50	5.379	89	1.408	128	0.467
12	27.18	51	5.197	90	1.363	129	0.456
13	25.92	52	4.986	91	1.322	130	0.444
14	24.73	53	4.802	92	1.282	131	0.433
15	23.6	54	4.625	93	1.244	132	0.422
16	22.53	55	4.456	94	1.207	133	0.412
17	21.51	56	4.294	95	1.171	134	0.401
18	20.54	57	4.139	96	1.136	135	0.391
19	19.63	58	3.99	97	1.103	136	0.382

Resistance Table of Tube Temperature Sensors for Indoor and Outdoor (20K)

Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)
-19	181.4		20	25.01		59	5.13		98	1.427
-18	171.4		21	23.9		60	4.948		99	1.386
-17	162.1		22	22.85		61	4.773		100	1.346
-16	153.3		23	21.85		62	4.605		101	1.307
-15	145		24	20.9		63	4.443		102	1.269
-14	137.2		25	20		64	4.289		103	1.233
-13	129.9		26	19.14		65	4.14		104	1.198
-12	123		27	18.13		66	3.998		105	1.164
-11	116.5		28	17.55		67	3.861		106	1.131
-10	110.3		29	16.8		68	3.729		107	1.099
-9	104.6		30	16.1		69	3.603		108	1.069
-8	99.13		31	15.43		70	3.481		109	1.039
-7	94		32	14.79		71	3.364		110	1.01
-6	89.17		33	14.18		72	3.252		111	0.983
-5	84.61		34	13.59		73	3.144		112	0.956
-4	80.31		35	13.04		74	3.04		113	0.93
-3	76.24		36	12.51		75	2.94		114	0.904
-2	72.41		37	12		76	2.844		115	0.88
-1	68.79		38	11.52		77	2.752		116	0.856
0	65.37		39	11.06		78	2.663		117	0.833
1	62.13		40	10.62		79	2.577		118	0.811
2	59.08		41	10.2		80	2.495		119	0.77
3	56.19		42	9.803		81	2.415		120	0.769
4	53.46		43	9.42		82	2.339		121	0.746
5	50.87		44	9.054		83	2.265		122	0.729
6	48.42		45	8.705		84	2.194		123	0.71
7	46.11		46	8.37		85	2.125		124	0.692
8	43.92		47	8.051		86	2.059		125	0.674
9	41.84		48	7.745		87	1.996		126	0.658
10	39.87		49	7.453		88	1.934		127	0.64
11	38.01		50	7.173		89	1.875		128	0.623
12	36.24		51	6.905		90	1.818		129	0.607
13	34.57		52	6.648		91	1.736		130	0.592
14	32.98		53	6.403		92	1.71		131	0.577
15	31.47		54	6.167		93	1.658		132	0.563
16	30.04		55	5.942		94	1.609		133	0.549
17	28.68		56	5.726		95	1.561		134	0.535
18	27.39		57	5.519		96	1.515		135	0.521
19	26.17		58	5.32		97	1.47		136	0.509

Resistance Table of Discharge Temperature Sensor for Outdoor(50K)

Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)
-29	853.5		10	98		49	18.34		88	4.75
-28	799.8		11	93.42		50	17.65		89	4.61
-27	750		12	89.07		51	16.99		90	4.47
-26	703.8		13	84.95		52	16.36		91	4.33
-25	660.8		14	81.05		53	15.75		92	4.20
-24	620.8		15	77.35		54	15.17		93	4.08
-23	580.6		16	73.83		55	14.62		94	3.96
-22	548.9		17	70.5		56	14.09		95	3.84
-21	516.6		18	67.34		57	13.58		96	3.73
-20	486.5		19	64.33		58	13.09		97	3.62
-19	458.3		20	61.48		59	12.62		98	3.51
-18	432		21	58.77		60	12.17		99	3.41
-17	407.4		22	56.19		61	11.74		100	3.32
-16	384.5		23	53.74		62	11.32		101	3.22
-15	362.9		24	51.41		63	10.93		102	3.13
-14	342.8		25	49.19		64	10.54		103	3.04
-13	323.9		26	47.08		65	10.18		104	2.96
-12	306.2		27	45.07		66	9.83		105	2.87
-11	289.6		28	43.16		67	9.49		106	2.79
-10	274		29	41.34		68	9.17		107	2.72
-9	259.3		30	39.61		69	8.85		108	2.64
-8	245.6		31	37.96		70	8.56		109	2.57
-7	232.6		32	36.38		71	8.27		110	2.50
-6	220.5		33	34.88		72	7.99		111	2.43
-5	209		34	33.45		73	7.73		112	2.37
-4	198.3		35	32.09		74	7.47		113	2.30
-3	199.1		36	30.79		75	7.22		114	2.24
-2	178.5		37	29.54		76	7.00		115	2.18
-1	169.5		38	28.36		77	6.76		116	2.12
0	161		39	27.23		78	6.54		117	2.07
1	153		40	26.15		79	6.33		118	2.02
2	145.4		41	25.11		80	6.13		119	1.96
3	138.3		42	24.13		81	5.93		120	1.91
4	131.5		43	23.19		82	5.75		121	1.86
5	125.1		44	22.29		83	5.57		122	1.82
6	119.1		45	21.43		84	5.39		123	1.77
7	113.4		46	20.6		85	5.22		124	1.73
8	108		47	19.81		86	5.06		125	1.68
9	102.8		48	19.06		87	4.90		126	1.64

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